KU LEUVEN

FACULTEIT SOCIALE WETENSCHAPPEN

The packaging puzzle

An investigation into the Income and Care Packages of the Belgian Elderly Population

Rika VERPOORTEN

Proefschrift aangeboden tot het verkrijgen van de graad van Doctor in de Sociale Wetenschappen

Promotor: Prof. Dr. J. Berghman+
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CONTENT

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ABBREVIATIONS

ADL	Activities of Daily Living
AIC	Akaike Information Criterion
B.A.	Bulletin of Acts [Belgisch Staatsblad]
BIC	Bayesian Information Criterion
CAPI	Computer Assisted Personal Interview
CD	Inter-cluster distance
DB2P	Database Supplementary Pensions
DWH LM&SP	Datawarehouse Labour Market and Social Protection
ECHP	European Community Household Panel
ESeC	European Socio-economic Classification
EU-SILC	European Survey on Income and Living Conditions
E_x	Life expectancy
FACH	Flemish Agency for Care and Health [Vlaams Agentschap Zorg en Gezondheid, VAZG]
FCS	Fully Conditional Specification Method
FPS	Federal Public Service
GP	General practitioner
HIS	Health Interview Survey
HECM	Home Equity Conversion Mortgages for Seniors
IADL	Instrumental Activities of Daily Living
ILO	International Labour Organisation
IMA	Intermutuality Agency [InterMutualistisch Agentschap]
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
JPI	Joint Programming Initiative
LASA	Longitudinal Aging Study Amsterdam
LOVO	Survey on the Living situation of Flemish Elderly [LeefsituatieOnderzoek Vlaamse Ouderen]
MAR	Missing At Random
NIHDI	National Institute for Health and Disability Insurance [Rijksdienst voor Ziekte- en Invaliditeitsverzekering, RIZIV]
N.S.	Not statistically significant at the 0,05 level
OECD	Organisation for Economic Co-operation and Development
OLO	Linear Bond [Obligation Linéaire/Lineaire Obligatie]
OR	Odds Ratio
P1	First pillar pensions
P2	Second pillar pensions

P3	Third pillar pensions
PCSW	Public Centre for Social Welfare [Openbaar Centrum voor Maatschappelijk Welzijn, OCMW]
PLF	Principal Limit Factor
PS	Poststratification
PSBH	Panel study of Belgian Households
r	Interest rate
R^2	Determination coefficient
RM	Reverse mortgage
RMS STD	Root-mean-square standard deviation
R.R.	Response rate
RS	R-squared
SHARE	Survey of Health, Ageing and Retirement in Europe
SPR	Semi partial R-square
SS	Social security benefits
VOZS	Flemish Elderly Care Survey [Vlaamse OuderenZorgStudie]

CHAPTER 1

INTRODUCTION

CHAPTER 1. INTRODUCTION

The population is ageing. Related topics are high on the agenda of policy makers and researchers. One of these topics, often the subject of debate, involves the risks of financial and functional dependency that are related to old age. Associated to this, our PhD research focuses on the wide range of mechanisms that are available to the elderly population to limit the consequences of financial and functional old age dependency.

In this chapter we describe the broad outline of the dissertation. Firstly, the demographic context of population ageing is illustrated. This is linked to the growing importance of old age related social risks, more specifically the risks of old age financial and functional dependency. Secondly, we introduce the main mechanisms that are available to protect the elderly population against the negative consequences of the financial and physical dimension of old age dependency. In this light, the packaging approach of Rainwater, Rain and Schwartz (1986) is presented as the main theoretical framework of our study. In section three, the main research questions and hypotheses are presented. A short introduction into the research design is given in section 4. The last section presents the outline of the dissertation.

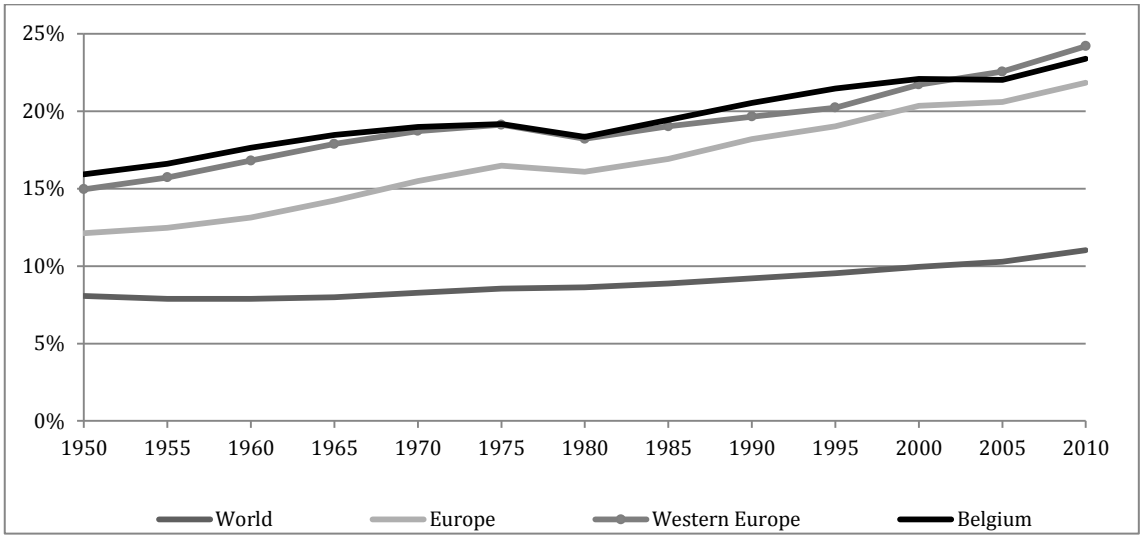
1. The context: Population ageing

In this section, we address the recent trends in population ageing, that go together with important increases in the older population, and specifically in the population of 80 years and over.

1.1 Recent trends in population ageing

The attention for old age social protection by researchers and social policy makers stems from an important increase in the relative importance of the elderly in the overall population. This trend is observed not only in Belgium, but all over Europe, and by extension all over the world. Even less developed countries do not escape the increase of the elderly population. Yet, the increase in the elderly population is considerably more important in Western Europe than in the rest of the world (see Figure 1.1). Whereas in the 1950s about 15% of the Western European population was aged 60 years and over, the relative importance of this age group increased to 24% in 2010 (an increase of 60%). A similar, yet less strong, increasing trend is observed in Belgium, where the relative importance of the population aged 60 years and over rose from 16% in 1950 to 23% in 2010 (an increase of 44%).

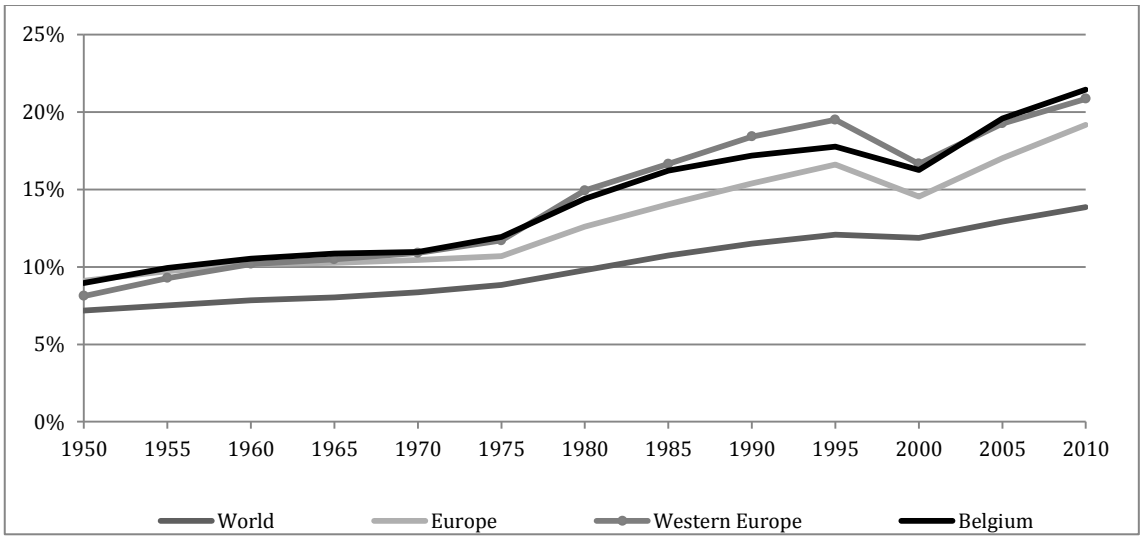
Figure 1.1. Evolution of the proportion of the population aged 60 and over in the overall population from 1950 to 2010



Source: Author's calculations based on United Nations, Department of Economic and Social Affairs, Population Division, 2011

Further, this increase in the elderly population has gone hand in hand with an increase in the population aged 80 years and over (the so-called oldest old). In Western Europe, the relative weight of the population aged 80 years and over within the age group of 60 years and over increased from about 8% in 1950 to 21% in 2010 (see Figure 1.2). A similar trend is discerned in Belgium .

Figure 1.2. Evolution of the proportion of the population aged 80 years and over in the population aged 60 years and over from 1950 to 2010



Source: Author's calculations based on United Nations, Department of Economic and Social Affairs, Population Division, 2011

The increase in the elderly population is considered as the final stage of the 20th century demographic transition, that marks a transition from a society with high rates of births and deaths to a society characterised by low rates of births and deaths. Improvements in health care and medical science, changes in the living conditions, the introduction of widespread social security, etc. have managed to reduce the mortality rate and lead to an increase in the life expectancy over the last decades. This trend of lowering mortality and increasing life expectancy went hand in hand with decreasing fertility rates and a decline in the relative proportion of the younger population group in the overall population. Consequently, the size of the younger age groups is no longer in balance with that of the older age groups, leading to an increase in the dependency ratio (i.e. the ratio of the size of the non-active population and the active population).[1] For example, in Western Europe the ratio of the population aged 60 years and over versus the population between 20 and 60 years increased from 0.28 in 1950 to 0.44 in 2010 (based on the population statistics provided by United Nations, Department of Economic and Social Affairs, Population Division, 2011).

1.2 Increasing importance of old age related social risks

The increase in the relative importance of the elderly population in the overall population makes that old age related social risks have become more important in the last decades. These risks refer to a certain degree of dependency that is associated to old age, with many different dimensions (e.g. functional dependency, mental dependency, economic dependency) (Pacolet, Bouten, Lanoye, & Versieck, 2000). In this study, we focus on two dimensions of old age dependency, namely financial or economic dependency and functional or physical dependency. These dimensions of dependency are strongly related to the welfare and wellbeing of the elderly population (cf. infra).

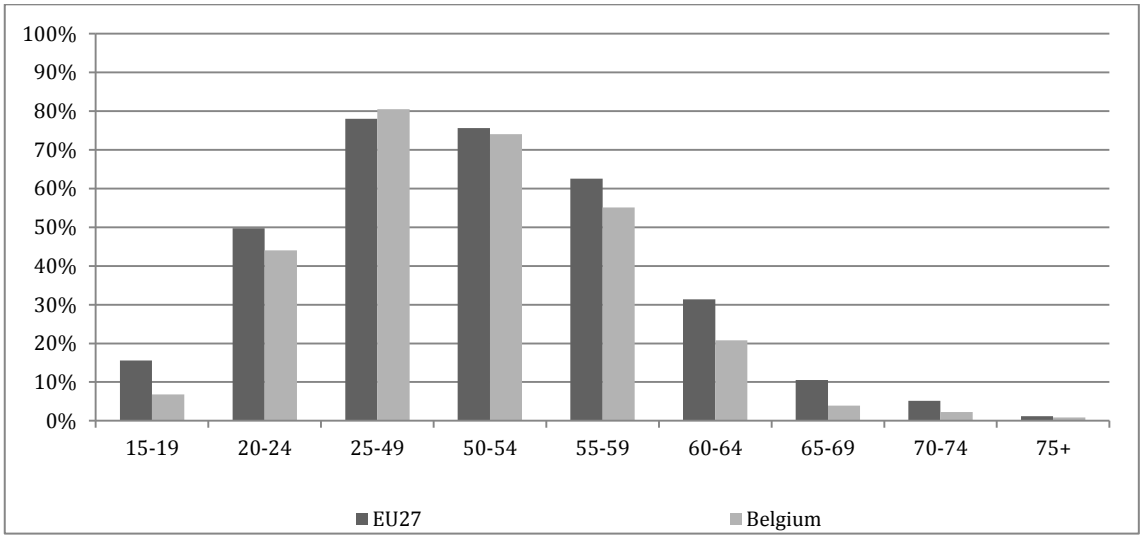
Already in the 1960s old age has been acknowledged as a risk for labour market participation (International Labour Organisation, 2006). Because of their age, elderly are faced with decreases in their productivity, for example because of health problems, and thus are confronted with limitations in their labour market participation. To overcome the risk of financial destitution that is associated with labour market withdrawal, the International Labour Organisation advised that subsistence after the age of 65 should be guaranteed via the provision of financial compensations, replacing the former labour market income. Mechanisms have been set up to provide sufficient protection against the financial dimension of dependency. These mechanisms have to provide an alternative income to prevent the elderly population from becoming poor and to ensure their

[1] The age limits used to calculate the dependency ratio can differ. For example, the United Nations limits the non-active elderly population to the population aged 60 and over, while the active population refers to the population between 20 years and 59 years of age.

standard of living. The most important mechanism is the public retirement pension, that provides a replacement income based on the previous labour market participation and the social security contributions paid during the active labour market career (Baltes, 1996). However, despite these alternative income mechanisms, the loss of labour market income makes the elderly population particularly vulnerable for poverty. According to statistics from the European Survey on Income and Living Conditions (EU-SILC), in 2011 about one fifth of the Belgian population aged 65 years and over was found to be at-risk-of-poverty, compared to about 14% of the population younger than 65 years (Eurostat, 2013a).[2]

The introduction of widespread income replacement schemes for the elderly population has led to very low levels of labour market participation from the age of 60. This is illustrated in Figure 1.3, which shows the employment rate in Europe for different age groups. The majority of the population aged 65 years and over is no longer active on the labour market. Within Europe about 5% of the population aged 65 years and over still is in employment, while in Belgium only 2% of this age group is still active on the labour market.

Figure 1.3. Employment rate in the EU-27 and Belgium, by age group (2011)



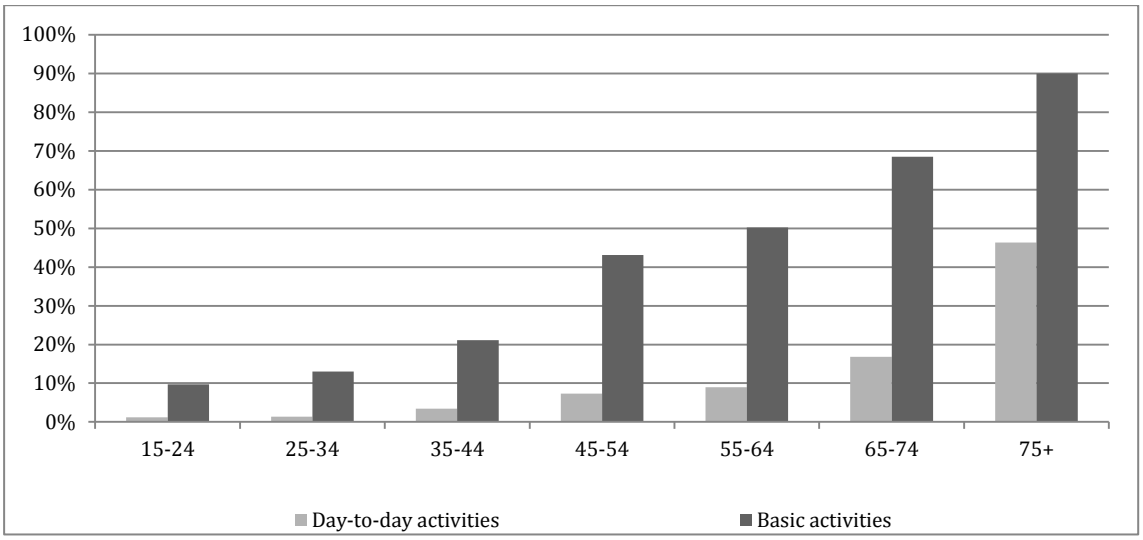
Source: Author's calculations based on Eurostat (2013)

Besides the withdrawal from the labour market and the increase in financial dependency, the elderly population is also confronted more with health problems and limitations in their daily activities than younger population groups. Statistics from the Belgian Health Interview Survey (HIS) 2008 show that the incidence of restrictions in the basic and daily activities increases importantly with age (see Figure 1.4) (Charafeddine, Demarest,

[2] The at-risk-of-poverty threshold is calculated as 60% of the EU-SILC equivalised median income.

Drieskens, Gisle, Tafforeau and Van der Heyden, 2008). While only 10% of the population aged 15 to 24 years is confronted with moderate to severe restrictions in basic activities like walking, climbing staircases, etc., this holds for more than 80% of the population aged 65 years and over. Similarly, almost 40% of the population aged 65 years and over has moderate to severe problems with daily activities like getting dressed, bathing and using the toilet, compared to only 1% of the youngest age group. This decrease in the health conditions increases the need for outside help by either professional and non-professional care givers. To illustrate, in 2008 more than 60% of the Belgian population using home health care services[3] was aged 65 or over. Similarly, about 75% of those receiving home help with household chores was 65 years or older.[4]

Figure 1.4. Proportion of the Belgian population with moderate to severe restrictions in day-to-day and basic activities, by age group (2008)



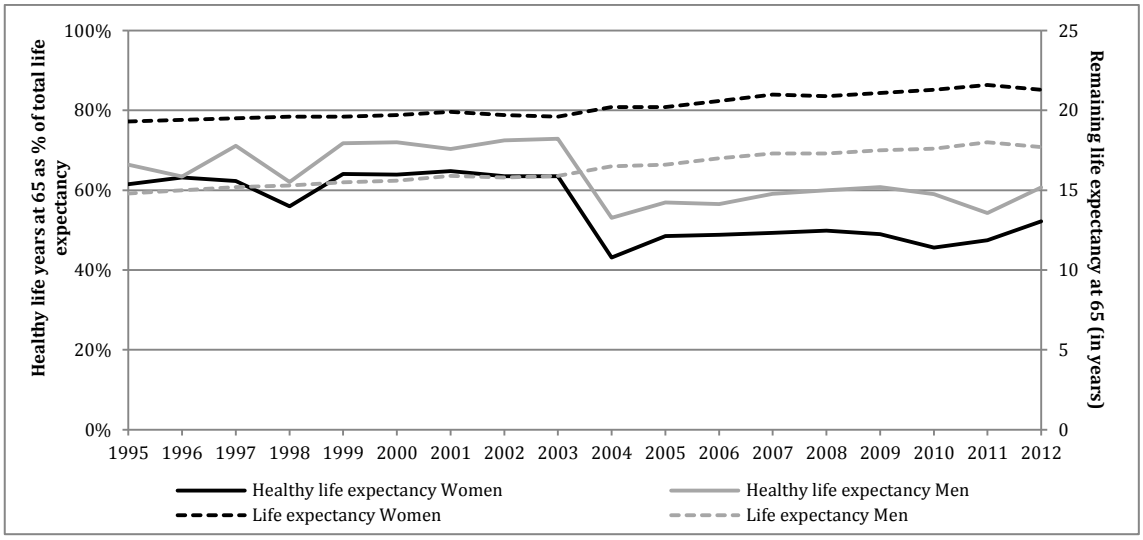
Source: Author's calculations based on Charafeddine et al. (2008)

In addition, research shows that the increasing life expectancy did not go hand in hand with an overall increase in the healthy life expectancy, The end of the life course is still marked by an important period of care dependency. For example, since 1995 the Belgian healthy life expectancy of the elderly population, expressed as a percentage of the overall life expectancy, has decreased with 9% for the male elderly population and with 15% for the female elderly population (Eurostat, 2014a, 2014b). In 2012, a 65-year Belgian old women was expected to live another 21,3 years, of which 11,1 years in good health (in 1995: resp. 19,3 years and 11,8 years). For men, the total life expectancy at the age of 65 in

[3] This refers to the use of home care services provided by a nurse or a midwife.
[4] Calculations based on the 2008 Belgian Health Interview Survey (Charafeddine et al., 2008).

2012 was 17,7 years, of which 10,7 years in good health (in 1995: resp. 14,8 years and 9,8 years).

Figure 1.5. Evolution of the life expectancy (in years) and the healthy life years at 65 (as % of the total life expectancy at 65) in Belgium between 1995 and 2012



Source: Author's calculations based on Eurostat (2014a, 2014b)

2. SOS old age: Protection against old age related social risks

This study focuses on the mechanisms that have to protect the elderly population against the negative consequences of two main dimensions of old age dependency, namely financial and functional dependency.

On the one hand, this includes different, publically and non-publically provided, income sources, like pensions (public pensions, employer pensions and private pensions), social security benefits, savings, property incomes, etc. The combination of these income sources has to provide protection against the financial dimension of old age dependency, and thus has to compensate for the wage loss because of the withdrawal from the labour market. On the other hand, the use of different types of health and social care services is included in this study, like contacts with doctors, specialists and hospitals, but also home help and personal care provided by either formal or informal caregivers. The health and social care services have to limit the negative consequences of increased functional dependency that is associated with old age.

The protection against the financial and functional dimension of old age dependency is not limited to a single mechanism. Elderly are expected to combine different income sources and health and social care services into packages to strive for a sufficient level of protection against the financial and functional dimension of old age dependency. To study

this combination of income and care mechanisms we draw on the packaging approach, that has been developed by Rainwater, Rein and Schwartz (1986) in their study on households' combinations of different income sources into income packages. This packaging approach is based on three main concepts: claims, institutional spheres and rewards. Individuals are active in three 'institutional spheres' (the family sphere, the political sphere and the economic sphere). Activities in these spheres make that individuals can 'claim' access to certain resources. These claims can be both explicit and implicit, and the resources that are granted to the individuals can be considered as 'rewards'. Because claims are made in different spheres, and lead to a range of different rewards, the combination of claims and rewards is considered to result in 'packages' (Rainwater et al., 1986). These packages have to contribute to a certain degree of stability and security in life, and an adequate and secure income.

Whereas Rainwater and his colleagues (1986) limited their study to households in the active life phase, we adopt the packaging approach to study the protection of the elderly population, because we believe that the notion of claims and rewards in the three institutional spheres can be quite easily transposed to the elderly population. In addition, we extend the original packaging approach by including not only monetary rewards, but by including also non-monetary rewards (i.e. health and social care services) that contribute to the welfare and wellbeing of the elderly population. Such a broad, holistic perspective allows us to draw a picture of the different ways in which the elderly population meet its need for protection against the financial and functional dimension of old age dependency. More details on the packaging approach as the main theoretical framework of this dissertation are provided in the second chapter.

Further, a detailed overview of the potential sources to be included in the old age income and care packages is given in the third and fourth chapter. In these chapters, we also pay attention to a number of sociodemographic and socioeconomic background variables like education, occupational status, sex and living situation that influence ownership of different sources and thus have an effect on the composition of the income and care packages of the elderly population. This enables us to investigate the differences and potential inequalities within the elderly population regarding their protection against old age dependency and the different needs associated to this.

3. Main research questions and hypotheses

Three groups of research questions are formulated to solve the puzzle of whether and how different protection mechanisms are combined into income and care packages by the elderly population and to what extent these packages provide a sufficient level of protection against the financial and functional dimension of old age dependency.

A first group of research questions focuses on the protection against the negative consequences of old age financial dependency. We investigate the composition of the old

age income package and the level of income protection provided by the old age income package. In doing so, we do not only include income sources like pensions and social security benefits, but we also investigate the potential income of financial assets (savings) and property ownership. Also the relationship between the composition and the generosity of the old age income package is investigated. In addition, we investigate whether sociodemographic and socioeconomic background variables influence the composition and the level of protection provided by the old age income package. This contributes to the already existing research on the income protection of the elderly population in several ways. Whereas the current research focuses quite strong on single income sources (e.g. research on pensions; research on property ownership), this study focuses on the combination of income sources into income packages and on the potential interplay between the different sources and the generosity of the income package. Secondly, we estimate the potential contribution of financial assets and property ownership to the main old age income package to investigate whether including assets can improve the income position of Belgian elderly. This also is expected to be interesting for policy makers that are exploring different ways to alleviate the pressure on the financing of the public pension scheme; increasing the personal responsibility and taking account of personal sources like home ownership and financial assets for the calculation of pension benefits is only one of the many options available.

The second group of research questions focuses on the wide range of services that are available to the elderly population to mediate the functional dimension of dependency. We investigate the existence of care packages, systematic combinations of health and social care services, provided by either formal or informal caregivers. The study focuses strongly on the role of the old age income package in explaining differences in the care package among the elderly population. The hypothesis is that, given an equal health and functional status, elderly with a more generous and a more diverse income package have a more diverse care package. This adds to the current research in that the contribution of assets is taken into account to explain differences in the use of care services. This could also be important for policy makers searching for a better understanding of the inequalities in the use of health and social care services and in the design of policy strategies to reduce these inequalities.

The third group of research questions is an evaluation of the extent to which the income and the care packages succeed in providing a sufficient level of protection against the financial and functional dimension of old age dependency. We expect that elderly with 'rich' old age protection packages are more capable of meeting their income and care needs and elderly with 'poor' protection packages. This is closely related to the assessment of the quality of the protection packages. For the financial dimension of old age dependency, this involves an evaluation of whether the income package provides sufficient protection against poverty, and the potential contribution of assets in doing so. For the functional dimension of old age dependency, this involves an evaluation of whether the care package is in line with the health and social care needs. Again this is important for policy makers that are willing to reduce inequalities in the protection of the

elderly population against old age dependency. Profound insights in the income and care packages of the elderly population, the interplay between both, and the relationship with the sociodemographic and socioeconomic background, will allow policy makers to tune their policy strategies towards to most vulnerable groups.

4. Research design

To investigate the packaging puzzle of the Belgian elderly population, we have constructed a quantitative, cross-sectional research design based on secondary survey data. The availability of the interesting and rich data from the Survey of Health, Ageing and Retirement in Europe (SHARE), and the fact that the survey includes information on both income and care sources of the elderly population has encouraged us to use these data. However, before starting the actual data analyses we have investigated thoroughly the quality of the data, to ensure the reliability of the research results. Our choice for a cross-sectional study of the income and care packages of the elderly population allows us to focus on the existence of differences between individuals at a certain point in time. Consequently, because our time frame is limited to one year, differences are not related to policy changes over time. In addition, we concentrate on the income and care packages of the Belgian elderly population, although to a limited extent we also compare the Belgian situation with that of the neighbouring countries. Further, the possibility to compare between the Belgian regions is also interesting, given the regional division of competences for both income protection and health and social care services in Belgium (cf. infra).

Our research population is limited to the population aged 60 years and over and living in Belgium at the moment of the interview. Three groups are excluded from the research population: elderly permanently living in residential care facilities, elderly not able to speak Dutch of French, and elderly in the German speaking Community. Elderly living in residential care facilities and in the German speaking Community were excluded from the SHARE sample framework, and thus are not included in the final sample. The exclusion of non-Dutch and non-French speaking individuals is based on the fact that the questionnaire is made up in Dutch and in French. Obviously, these limitations in the research population have to be taken into account when interpreting the research results. The final sample consists of about 1.600 respondents, living in Belgium and aged 60 years and over.

5. Outline of the study

In this introductory chapter, the broad context of the study was outlined. Attention was paid to the process of population ageing, resulting in an important increase of the elderly population. This increase of the elderly population was linked to the growing importance of old age related social risks, with specific attention for the risks of financial and functional dependency. Within this respect, we stressed the importance of an advanced

investigation in the mechanisms protecting the elderly population against the risks of financial and (long-term) care dependency. This study aims to meet this need, and aims to have sufficient attention for the (societal) mechanisms explaining differences in the (level of) protection enjoyed by the elderly population.

With this dissertation, we wish to add to and complement the already existing literature in the field of (sociological) ageing research. We attempt to sketch a complete picture of the different sources of protection available to the elderly population. Whereas the focus of the current research often is limited to income-related protection on the one hand, or to health and/or (long-term) care services on the other hand, this research focuses on the combination of these sources by the elderly population in so-called old age protection packages. In doing so, we do not to limit ourselves to a specific group of elderly, but we wish to provide a view on the larger elderly population. Yet, this does not mean that differences within the elderly population will be ignored; attention will be paid to sociodemographic and socioeconomic characteristics that lead to higher risks on destitution.

The theoretical foundation of this approach on old age protection against the main dimensions of old age dependency is discussed in the second chapter. We draw on the income package approach of Rainwater et al. (1986) to investigate the income and care mechanisms available to the elderly population. The original insights of Rainwater et al. (1986) on the combination of different income sources in households are extended to the elderly population. Moreover, we will not limit the concept to income sources, but we will also include the wide range of care sources that are available to the elderly population.

In chapter 3 and chapter 4 we focus on the specific protection mechanisms that are available to the Belgian elderly population to provide protection against resp. the financial and the functional dimension of old age dependency. In these chapters, an overview is provided of the possible components of the old age income and care packages of the Belgian elderly population. We also pay attention to the sociodemographic and socioeconomic determinants explaining differences in the old age income and care packages of the elderly population (e.g. sex, age, socioeconomic status, etc.).

Based on the theoretical insights from the preceding chapters, we formulate research questions and hypotheses in the fifth chapter of this dissertation. Three groups of research questions are distinguished, focusing respectively on the old age income package, the old age care package and the ability of both packages to provide a sufficient level of protection against the negative consequences of old age financial and functional dependency.

In chapter 6, the research design is discussed. The main motives why we have opted for a quantitative analysis of secondary survey data are highlighted. After an exploration of the available data sources, our choice to work with data from the Survey of Health, Ageing and Retirement in Europe (SHARE) is explained. The advantages and disadvantages of working with these data, as well as strategies to overcome the most important disadvantages, will be considered. In addition, we elaborate on the demarcation of the research population.

Chapters 7 to 10 hold the empirical body of this study. In chapter 7 the operationalisation of the old age income package, based on the SHARE data, is discussed. A cluster analysis is used to investigate the existence of meaningful clusters of income sources in the data. In chapter 8 we investigate the old age income package. Not only a description of the composition of the old age income package is provided, also an in-depth investigation of the determinants influencing and explaining differences among the elderly population in these income packages is presented. Further, our attention is not limited to the immediately available income sources, like pensions. We also include financial assets and property wealth in the old age income package. Both the actual contribution and the potential contribution of these asset sources to the old age income package is investigated.

A similar strategy is adopted to investigate the protection against the functional dimension of old age dependency. In chapter 9, the operationalisation of the health and social care package is discussed. Again, a cluster analysis is used to investigate the existence of meaningful clusters of health and social care services used by the elderly population to mitigate the negative physical consequences of ageing. In chapter 10 we focus on the distribution of these care packages among the elderly population. Particular attention is paid to the role of the old age income package in explaining differences in the care packages among the elderly population.

In the concluding chapter, some final reflections on the study are formulated. We tackle the main outstanding "W's" that are found in all PhD projects: Where did we started from? What does our research contribute? What could have been better? What do these findings imply for the future? We will make some methodological and theoretical reflections. Particular attention is paid to the policy decisions that nowadays are high on the political agenda in Belgium.

CHAPTER 2

THE PACKAGING PUZZLE

CHAPTER 2. THE PACKAGING PUZZLE

In the previous chapter, insights were provided in two main dimensions of dependency associated with old age: financial dependency, related to labour market withdrawal, and functional dependency, because of age-related declines in health and functional status leading to a certain degree of care dependency. Several mechanisms are available to provide sufficient protection against these dimensions of dependency. Similarly, different actors are responsible for the provision, organisation and financing of these mechanisms. Historically, the government has been granted a central role in this, although recently also other non-public actors have come to the front in the organisation of different protection mechanisms.

In this chapter, we present the main theoretical framework that is used for our research: the packaging approach of Rainwater, Rain and Schwartz (1986). This approach considers the wide range of mechanisms that are available to the population and that contribute to the security, safety and stability of the population. These mechanisms are based on a system of claims and rewards in three institutional spheres (the family sphere, the economic sphere and the political sphere). In the first section of this chapter, we will discuss the main points of interest of the packaging approach. In the second section, we rethink the packaging approach from the observation that the population is ageing and the increasing importance of old age dependency (and specifically financial and functional dependency). This results in the two main concepts that are central in our study: the old age income package and the old age care package.

1. The packaging approach as the basic theoretical framework

The packaging approach has been developed in the 1980s by Rainwater et al. (1986) in their research on the composition of the household income of families in Sweden, the United Kingdom and the United States. Rainwater et al. (1986) used micro-data from three surveys (Swedish Level of Living Survey, the UK General Household Survey, and the US Panel Study of Income Dynamics) for a detailed investigation of the income packages of the population, with specific attention for the different household types in the income distribution.

In the next sections, we discuss the main points of interest of the packaging approach. Where possible, we complement the packaging approach with theoretical insights from other social scientists active in the field of social protection and the welfare state.

1.1 The basics: claims, rewards and institutional spheres

The main components of the packaging approach are the claims that are made by the population, the institutional spheres in which the claims are made in society, and the rewards that are the results of these claims and that are the components of the claiming package.

1.1.1 Claims

Rainwater et al. (1986) based their concept of income packaging on the notion of claims: "the ways in which people can come to command resources in a society" (Rainwater et al. 1986, 12). Claims are distributional rules that allocate resources over the members of a society. Claims are not always explicit, some rewards (incomes) are the result of claims that were made in the past and have become more or less established; the link between the 'reward' and the 'claim' however is less explicit in that case. Overall, the underlying goal of the whole claiming system is the preservation of stability and security, and having an adequate and secure income. The rewards that are the result of the claims have to contribute to one's welfare and wellbeing. The claims are made in three major institutional spheres: the political sphere (the government), the family sphere, and the economic sphere. Within each sphere, individuals handle and interact to obtain certain resources. The principles, logic and structures of these interactions are different in the three spheres.

1.1.2 Three institutional spheres

As mentioned in the previous section, individuals and households can make claims in three institutional spheres: the family sphere, the economic sphere and the political sphere.

The political sphere

In the political sphere, claims are based on three principles. First, it is the government's moral obligation to support its members and to mitigate certain needs. This is closely related to the observations of Titmuss (1974b) on the role of social policy. The government has to organise a wide range of social protection mechanisms that have to support individuals and households that are confronted with 'needy situations', and that no longer can look after themselves or their household members. Further, within the political sphere, policy makers have to decide what situations are considered as 'needy situations'. This is closely related to the societal and historical context in which the

mechanisms were developed.[5] According to Briggs (1969 [2000]), the industrial context played an important role in the demarcation of social risks in the early days of the welfare state. This view is supported by the industrialism thesis that states that the welfare state has been developed as "a response to the news 'needs' generated by the development of industrial societies." (Pierson, 1999, p. 17). In addition, also political orientations, the preferences of policy makers, the administrative context and the will of policy makers to organise social protection mechanisms influences what circumstances are acknowledged as 'needy' (e.g. Hartley, 2010; McKillip, 1987).

Second, the principle of redistribution that is central in the contemporary welfare state is an important principle that justifies the claims that are made in the political sphere. This resembles the central role that is given to redistribution via social protection by Titmuss (1964 [2001]). Within his theory, redistribution via social protection is twofold. On the one hand, social protection has to contribute to equality within society via vertical redistribution, i.e. a redistribution of resources from the richer to the poorer population groups. This is organised in the political sphere via systems of social assistance, that are targeted to the most destitute parts of the population. However, also income-based social security often includes a notion of vertical redistribution via the inclusion of income ceilings in the calculation of the benefits, but not in the calculation of the contributions. On the other hand, social protection aims for horizontal redistribution, from those without a specified risk to others that are confronted with that risk. For example, within the political sphere families with children can claim for child allowances and families without children cannot. In this way, there is a redistribution of resources from families without children to families with children.

The third principle involves that a wide range of initiatives within the political sphere are based on notions of citizenship. Being part of the society opens the right to certain social protection mechanisms. For example, the right on minimum social assistance overall is based on citizenship: universal minimum income schemes are organised by the government to protect its citizens against poverty and destitution (Pierson & Leimgruber, 2010; Van Langendonck & Put, 2002).

[5] This implies that the definition of needs is not static; instead it is expected to be dynamic and change whenever the socioeconomic and sociodemographic context changes. This is visible in contemporary welfare states that protect against 'old' and 'new' social risks. The 'old' social risks, like unemployment, occupational injuries and sickness, find their roots in the period of industrialisation in which the welfare state was installed. The 'new' social risks (e.g. maternity protection, family and child burden) on their turn are rooted in the period of post-industrialisation (Taylor-Gooby, 2004).

The economic sphere

Within the economic sphere, claims are based on the notion of productivity, as a compensation for work that was done, for services that were provided, and for capital that was made available. Here we can find 'rewards' such as wages, employer-sponsored benefits, interests and dividends from capital, etc. The importance of the economic sphere to make claims, depends on the claiming actors. For example, the economic sphere is particularly important for individuals and households in the middle life phase, as was the case in research of Rainwater et al. (1986), but it will be less important for individuals and households that are in a later life phase (cf. infra).

The family sphere

Within the sphere of the family, lastly, the claims are based on the principle of solidarity and exchange, with obligations resulting from affinity, reciprocity, and tradition. The claims that are made are different for different families and also not all family members can make the same claims (Rainwater et al., 1986).

1.1.3 Rewards and claim packages

The claims in the three spheres result in different types of 'rewards'. These rewards do not always take the form of money income, also services and goods can be provided. Yet, it must be admitted that in the contemporary society money income is the most common answer to the claims that are made. Different claims, in different institutional spheres, lead to different rewards that are combined into "claim packages" (Rainwater et al., 1986, p. 18). In the political sphere, a wide range of rewards has been installed via social policy. These include the provision of services and income transfers in the health care sector, education, housing, income maintenance (e.g. social security and social assistance benefits for old age, unemployment, labour injury, etc.)[6] and personal social services (Pierson, 1999). In the political sphere, the claims can also result in reduced spending, in that the 'rewards' exempt households from certain taxes to be paid. For example, low-income households or families with children can claim for more favorable taxation rates based on their household situation.[7] In the economic sphere, the claims result in, among others, wages, employer-sponsored health insurance, occupational pensions, interests and dividends, etc. In the family sphere, the claims will result often in the provision of services,

[6] This resembles the notion of social welfare in Titmuss' (1974a) categories of welfare provision.
[7] This is closely related to notion of fiscal welfare (Titmuss, 1974a).

like social care, but also gifts and financial transfers are considered as 'rewards' in the family sphere.

Rainwater et al. describe the combination of rewards into claim packages as "the arithmetic sum of many separate sources (components) of income [within the household]" (Rainwater et al., 1986, p. 251). As discussed in the previous section, these income sources are the result of a complex process of claiming in different institutional spheres. In the research of Rainwater et al. (1986), labour market income was found to be the primary source of income for many families, and central in the majority of the household income packages. Also different types of (publically provided) income support, distributed in the political sphere, were included in the household income package. This involved public benefits and subsidies, that can be spent at one's own discretion, but also "cash-like in-kind benefits (…) [for example] the value of student aid, labour market training allowances, food stamps, and housing allowances" (Rainwater et al., 1986, pp. 7–8). Further, account was given to incomes from savings, interests or dividends from capital, and rental incomes to the household income package. Lastly, private transfers (between private individuals), like alimony and informal financial support, were included (Rainwater et al., 1986, pp. 251–253). Table 2.1 gives an overview of the different components.

Table 2.1. Composition of the income package

Earnings	• Earnings of the male head of household – includes wages, salary and self-employment income • Earnings of the female head of household
Public transfers	• Total work-related transfer income of the household – includes social security, unemployment and sickness benefits; transfer payments to which one is entitled of virtue of being employed. These are frequently forms of social insurance to which the worker has made contributory payments either directly or through his/her employer. Nevertheless, they are distributed by the government. • Means-tested transfer income for the household – includes welfare or public assistance, social help, and supplementary benefits distributed by the government. • Universal cash transfers – governmental transfers which are neither means-tested nor work-related. For example, unconditional child allowances fall into this category.
Private income	• Capital income of heads of household – includes interests, dividends, and income from rent • Private pension payments • Private transfers – payments one receives from other individuals rather than the government; includes alimony and/or any other regular amount from relatives or friends.
Other	• Total taxable income of other (non-head(s) of household) adults • Miscellaneous transfers – transfer income which could not be allocated to one of the above categories.

Source: Rainwater et al. (1986, p. 252)

Households compose their unique claim package, depending on the institutional spheres in which the household members are active, on their needs and preferences. This implies that, for example, a household that is not involved in the labour market is expected to make less claims in the economic sphere but will make more claims in the political and/or family sphere. The income package of this household will thus not include wages, but will include proportionally more social assistance benefits, allowances, other public benefits, gifts, etc. This also implies that these claim packages are not static: when the household's needs and preferences change, the claims made will also change and the composition of the claim package will be modified.

1.2 Critical reflections on the packaging theory

Some critical reflections can be made on the packaging theory of Rainwater et al. (1986). Although the researchers mention that the boundaries between the spheres are somewhat blurred, but they do not go into the details of the possible overlap and interplay between the spheres, although this is of particular importance in the context of the contemporary welfare state.

First, we wish to address the interaction between the economic and the political sphere. An important part of the income protection that is provided by the state is based on actions within the economic sphere. Social security benefits are often limited to workers, and depend on the wage-related social security contributions that were paid (cf. infra). Similarly, some rewards and claims in the economic sphere are the result of actions of the political sphere. When a legal framework, that regulates the claims and the rewards in the economic sphere, is set up by the government, the political sphere seeps into the economic or the family sphere. This is the case for, for example, specific rewards granted in the economic sector, but bound to government regulations on access, financing, benefits, eligibility, etc.[8] This also is the case when the government provides tax incentives to actors in the economic sphere to organise certain rewards or to make certain claims (e.g. Johnson, 1987). To illustrate, this includes employer sponsored pension plays and additional employee health insurance schemes.

Further, we find that the political sphere increasingly shifts responsibilities to the economic sphere, under the rationale to alleviate the financial burden on public social protection schemes. This explains for example the growing importance of private pension schemes and private health insurance schemes. However, because the rationales in the economic sphere and in the political sphere are different, this brings about important challenges for the contemporary welfare state (e.g. Ginn & Arber, 1999; Johnson, 1987;

[8] This resembles the notion of occupational welfare, one of the three types of welfare distinguished by Titmuss (1974a). Occupational welfare includes the in cash and in kind mechanisms organised by the employer for his employees, within the legal framework and regulations of the government.

Pearson & Martin, 2005). Responsibilities that are shifted from the political to the economic sphere no longer are based on the rationale of equality, moral obligations and citizenship. Notions of productivity will get the overhand, and people not able to make productivity-based claims will face increased difficulties in finding adequate protection, and ensuring the overall stability and security of their lives.[9]

In addition, the interaction between the three institutional spheres also implies that when the claims in one sphere are insufficient or absent, households draw on other spheres to compensate for this lack. To a certain extent these compensations are structurally incorporated in the other spheres, particularly in the political sphere. For example, social assistance, that is provided in the political sphere, is only available when no other claims can be made; it acts as a ultimate safety net for individuals or households that can make no proper claims.

One should also note that the interplay between the three spheres, and the importance of the three spheres depends from country to country. This is closely related to the role and the interpretation that is given in the political sphere to the social policy concept. Depending on the social policy goals and objectives that are laid down by policy makers in the political sphere, the government's actions range from minimal to fairly extensive. In case of minimal actions in the political sphere, the other two spheres will be more important, while in case of extensive actions in the political sphere, the family sphere and the economic sphere will be less important. This is closely related to the welfare state configuration: in the welfare regime typology of Esping-Andersen (1990) for example, the three main actors that are discerned (government, family, commercial sector) correspond to the three spheres that are central in the packaging theory of Rainwater et al. (1986).

Lastly, it must be stressed that the "claim package" of Rainwater and his colleagues (1986) shows a strong preference for money income. As a consequence, non-cash sources that indirectly contribute to the disposable income are excluded, although their potential contribution to protecting the welfare and wellbeing of the population cannot be neglected.

2. Applying the packaging approach to old age protection

In the development of their packaging concept, Rainwater et al. (1986) explicitly focused on households in the middle stage of the life cycle to guarantee an interplay between the different institutional spheres. However, we consider the packaging approach as an

[9] This trend can already be observed in countries where the economic sphere plays an important role in society. According to research of Vogel (1999), higher poverty rates and important inequalities in the income distribution are found in countries where the economic sphere is central, than in countries where the political sphere plays an important role.

interesting theoretical framework to investigate the protection of the elderly population, and specifically the protection of the elderly population against the financial and functional dimension of old age dependency. In the next sections, we will discuss the notions of claim, spheres and rewards from the specific perspective of the elderly population.

2.1 Claims

As discussed in the previous chapter, the elderly population is confronted with old age financial and functional dependency. The claims older individuals and households make intend to reduce the negative consequences of this old age dependency, and have to contribute to their welfare, wellbeing, safety and stability. It must be noted however that, because of the confrontation of the elderly population, with functional dependency we explicitly have to include non-monetary 'rewards' to the claims for safety, welfare and wellbeing that are made by the elderly population. In kind care mechanisms are needed to protect the elderly population against the negative effects of physical ageing. This is an extension of the original packaging theory of Rainwater et al. (1986), in which in kind mechanisms were not included in the claim packages and the focus was on monetary income as the main reward.

2.2 Three institutional spheres

As the households that were included in the study of Rainwater et al. (1986), older households make claims in three institutional spheres: the family sphere, the economic sphere and the political sphere. Claims in the family sphere are based on notions of intergenerational solidarity, reciprocity and altruism. Within families, younger relatives are expected to stand in for the welfare and wellbeing of older relatives whenever this is necessary, and vice versa. This often takes the form of informal care from children to their older parents (Arber & Attias-Donfut, 2000; Daatland, 1990). The claims in the family sphere can be stimulated by the actors in the political sphere, for example via the provision of informal care subsidies to compensate informal care givers for the care they provide. These subsidies can be claimed by informal care givers in the political sphere, based on their actions in the family sphere; or they can be claimed by the informal care receivers, based on notions of solidarity and citizenship (cf. infra). Also, the political

sphere can enforce these claims in the family sphere by drawing a legal framework for the provision of care to family members in need.[10]

Claims in the economic sphere are based on the contributions individuals have made during their labour market career, or on the capital they provide (via savings, stocks and bonds, etc.). For example, elderly can claim for an employer-provided occupational pension based on the employment during their active life phase. Further, sometimes elderly can claim for additional health insurance based on the continuation of their employer-provided health insurance plan.

Lastly, the political sphere – the government – is very important when the protection of the elderly population against age-related dependency is considered. The claims that are made by the elderly population within the political sphere are based on different rationales. A first rationale underlines the fact that old age is considered as a social risk, and that providing protection against the needs related to this risk is one of the seminal tasks of the contemporary welfare state. Old age is one of the social risks that is acknowledged in the political sphere to be covered by society, via a system of social protection.[11] A second rationale, that allows elderly to claim for protection against old age dependency, stresses the importance of social equality and the need of redistribution. Resources are redistributed from individuals and households not confronted with the risk of old age to individuals and households that are confronted with this risk (horizontal redistribution). Moreover, within the elderly population, certain groups can claim for increased level of (income) protection because they have a higher risk on poverty and destitution. Vertical redistribution takes places between high-income individuals and households and low-income individuals and households. Lastly, from the citizenship rationale, elderly can claim old age social assistance, and health and social care services. The preservation of a good health status of the population and the provision of health and

[10] An important strand of literature exists on the interplay between the political and the family sphere in the provision of social care. Much has been written about whether or not protection that is provided in the political sphere rules out the protection that is provided in the family sphere. One could expect that the development of a wide range of care initiatives in the political sphere has encouraged elderly to make more claims in the political sphere and less in the family sphere. However, only limited evidence is found for this crowding out of claims in the family sphere by the political sphere (e.g. Liliana E. Pezzin, Kemper, & Reschovsky, 1996; Liliane E. Pezzin & Schone, 1999; Viitanen, 2007). The bulk of the research points to a certain degree of complementation between the political and the family sphere. Elderly in need of care make claims in both spheres, but the rationale of the claims and the rewards is different. For example, researchers (e.g. Attias-Donfut & Rozenkier, 1995; Bonsang, 2008; Brandt, Haberkern, & Szydlik, 2009; Daatland & Lowenstein, 2005; Künemund & Rein, 1999) have found that in the political sphere claims are made for specialised care, or social care services that cannot be provided by care givers in the family sphere; while in the family sphere claims are made for the daily, non-specialised care.

[11] Old age is included in the classification of social risks of the International Labour Organisation (2010). Further, also the European Commission (European Commission Employment and Social Affairs, 2009) and the OECD (OECD Directorate for Employment, Labour and Social Affairs, no date) acknowledged the increased risks that are related to old age and the central role the government has to play in providing protection against these risks.

social care services is often considered as one of the seminal tasks of the contemporary welfare state (either via the organisation of these services or via the installation of a health and care insurance scheme) (Pierson & Castles, 2000; Titmuss, 1974b).

2.3 The rewards: the old age income and care package

As said, the claims of the elderly population are focused on the two main dimensions of old age dependency: financial dependency and functional dependency. The old age income package includes the rewards from the claims elderly make in the three spheres to protect themselves against falling into poverty and to safeguard their standard of living after leaving the labour market. The old age care package includes the rewards from the claims elderly make to protection their health and functional status, and to safeguard their welfare and wellbeing.

First, we consider the potential components of the old age income package. Overall, public pensions are found to be the main component of the old age income package. Claims for public pensions are made in the political sphere, and are based on notions of solidarity and citizenship (cf. supra). Public pensions are particularly important in countries where quite generous social security pensions have been developed (e.g. Belgium, Germany, Sweden, etc.) (Börsch-Supan & Reil-Held, 1997; West Pedersen, 2004). The claims for public pensions are to a certain extent also based on the former activities of the elderly in the economic sphere (cf. supra). Public pensions are often related to the former wage, the length of the labour market career and the social security contributions paid. This again underlines the interaction between the political and the economic sphere. In addition, in the public sphere also old age social assistance and a wide range of other in cash benefits are found to compensate for the financial risk of old age. In the economic sphere, occupational pensions and private pensions have grown in importance in the last years, driven by the claims for additional protection in the economic sphere, but also from the rationale of the political sphere to reduce the financial burden of the public pension system by increasing the role of other, non-public income sources (European Commission Social Protection Committee, 2006) (cf. supra). The revenues from financial assets on their turn are expected to be an important source of income for the elderly population, not only because they contribute directly to the household income via interests and dividends, but also because of their indirect contribution. Savings are considered to be a financial back-up that can be spent in case of unexpected expenses (Keynes, 1936, cited in Browning & Lusardi, 1996; Casey & Yamada, 2002). The same is true for property ownership. Home ownership does not yield a direct income, but - when the mortgage is redeemed - it 'releases' the household budget from rent, leaving mortgage-free home owners with a larger disposable income than tenants (Kemeny, 2005; Ritakallio, 2003). In the family sphere, financial transfers and gifts could contribute to the income package of the elderly population. However, the relative weight of these informal transfers is expected to be

rather limited, since claims in the family sphere mostly result in the provision of services and goods (cf. supra).

Second, we consider the potential components of the old age care package. A wide range of mechanisms and services have been organised to mitigate the adverse effects of the age-related decreases in the population's health and functional status. These include a wide range of mechanisms that provide financial compensations for the use of the health and social care services. Elderly compose their care packages based on their needs and preferences, depending on the sources and actors that are available. This leads to a kind of "patch working" or "quilt making" of care services (Balbo, 1987, cited in Gerhard, Knijn, & Weckwert, 2005). Health care services include, among other, consultations with doctors and specialists, inpatient and outpatient treatments in hospitals, rehabilitation, nursing care, etc. Common to the health care services is that they are provided by professional, specialised and trained care givers (e.g. doctors, nurses, therapists, specialists, etc.), either inside or outside the home of the care receiver. The services themselves or reimbursements for the use of these services via health insurance schemes can be claimed in the political sphere (via public health services and/or national health insurance schemes) or in the economic sphere (employer-provided health services or health insurance schemes). The specialised character of the health care services makes them less interesting for the family sphere. Besides health care services, also the wide range of social care services are included in the old age care package. This refers to all services associated to help with basic activities of daily living and instrumental activities of daily living (resp. ADL and IADL). Help with ADL refers to personal care like bathing, getting dressed, using the toilet, eating, etc., while help with IADL refers to home help (gardening, shopping, cooking, etc.) (European Commission Directorate for Employment, Social Affairs and Equal Opportunities, 2008; Organisation for Economic Cooperation and Development, 2005). The – overall – low degree of specialisation that is needed to provide these care services, makes them open for claims from the three institutional spheres: the political sphere (as part of the public health services and the national health or long-term care insurance schemes); the economic sphere (as part of an employer-provided health or long-term/social care insurance scheme); and the family sphere (informal care provided by relatives).[12]

3. Conclusion

In this chapter, the main theoretical framework of this study was discussed. In the packaging approach, Rainwater et al. (1986) combine the concepts of 'claims', 'rewards'

[12] The old age care package refers to the type of care, irrespective of the location of the care provision. Consequently, also the care provided in (semi-)residential care facilities can be part of the old age care package.

and 'institutional spheres' to discuss the combination of income sources by households to safeguard their living situation, financial stability and security. The focus is on money income, although Rainwater and his colleagues (1986) do not neglect the potential importance of other non-monetary income sources.

As discussed, to use the packaging approach of Rainwater et al. (1986) to study the protection of the elderly population, we expand and widen the original theory. We expand the theoretical concept by applying it to a different population, namely the elderly population. This is particularly interesting in the light of the current process of population ageing and in the increasing prevalence and importance of age-related dependency issues, like financial and functional dependency. In addition, we widen the original concept by including not only income sources (in cash), but by including also help and care (in kind). Both sources have to contribute to protecting the standard of living after retirement, to providing protection against destitution and poverty, and overall, to contribute to the welfare and wellbeing of the elderly population.

In the next chapters we explore the potential components of the income and the care packages of the elderly population. In chapter 3 the wide range of income sources available to the Belgian elderly population is discussed. In addition, we also give an overview of the current research explaining differences in the income sources. In chapter 4, we focus on the wide range of health and long-term care services that are available to the elderly population. Also the determinants explaining differences in the use of these health and long-term care services are discussed.

CHAPTER 3

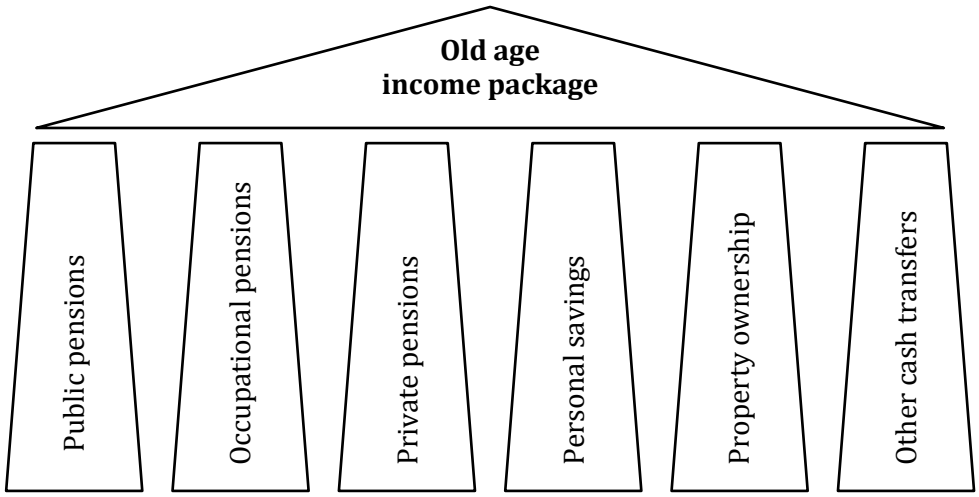
THEORETICAL EXPLORATION OF THE OLD AGE INCOME PACKAGE

CHAPTER 3. THEORETICAL EXPLORATION OF THE OLD AGE INCOME PACKAGE

In the previous chapter, we introduced the packaging approach as the theoretical framework that is used in this dissertation to study the protection of the elderly population against the consequences of old age financial and functional dependency. In this chapter, the actual sources available to the elderly population to protect them against the risks of old age financial dependency will be discussed. In doing so, more general research on the old age income package is reviewed, and an extensive overview of the different income sources available to the elderly population within the Belgian context is provided. Lastly, attention is paid to a number of determinants influencing the composition and the protection provided by the old age income package.

The insights should lead to the conclusion that, whereas old age income protection often is conceived as a three-pillar system including public pensions, occupational pensions and private pensions, actually six income pillars can be discerned. Besides public pensions, occupational pensions, and private (fiscally stimulated) pensions, the old age income package also includes personal (non-fiscally stimulated) savings, property ownership and other public cash transfers (see Figure 3.1).

Figure 3.1. Multi-pillar composition of the old age income package



1. General insights

Different studies have been conducted comparing the composition of the income package of the older population in different Western countries (e.g. Börsch-Supan & Reil-Held,

1997; Casey & Yamada, 2002; Ebbinghaus & Neugschwender, 2011; Gornick, Sierminska, & Smeeding, 2009; Heinrich, 2000; Kohl, 1992; Rein & Turner, 1999; Smeeding & Sandström, 2005; West Pedersen, 2004; Whitehouse, 2000; Williamson & Smeeding, 2004; Yamada, 2002). A general finding from these studies is that important differences exist between countries on the composition of the income packages of the elderly population. These differences can be traced back to the government's policy orientations, the socioeconomic context, historical events, etc.

Roughly speaking, the different compositions of the income package can be linked to the welfare state configurations in the welfare regime approach of Esping-Andersen (1990). This was confirmed in a study of Maître, Nolan, and Whelan (2005), where the composition of the income package was analysed for all EU Members States (except Sweden) based on data from the third wave of the European Community Household Panel (ECHP) (see Table 3.1). Public transfers were found to be more important in social-democratic and conservative welfare states, while occupational pensions showed to be more important in the liberal regimes (see also Börsch-Supan & Reil-Held, 1997; Casey & Yamada, 2002). This corresponds with the importance of the political sphere and the economic sphere in the different welfare regimes (cf. supra).

Table 3.1. Components of the income package and the welfare state configuration

Welfare state configuration	Public versus private income components
Liberal (e.g. UK, US)	• Minor role of public pensions in retirement income package • Important contribution of private pensions to retirement income package • Public pensions more important for those in lower income quintiles
Conservative (e.g. France, Germany)	Major role of public pensions in retirement income package
Social-democratic (e.g. Sweden, Denmark)	• Major role of public pensions in retirement income package • Overall important role of public pensions (independent of income)

Source: Börsch-Supan & Reil-Held (1997); Casey & Yamada (2002); Maître et al. (2005); West Pedersen (2004)

However, the differences in the composition of the old age income package only hold for the relative importance of the components in the total income. In general, the income package of the elderly population consists of the following components, irrespective of the welfare regime configuration (in descending importance):

- public pensions, either earnings-related or flat-rate;
- occupational pensions, provided via the employer;
- other private income sources, like income from personal pension plans and capital income (interests, dividends, etc.).

Overall, public pensions (both earnings-related and social assistance pensions) are the most important part of the retirement income package, independent of how the public pension system is organised (e.g. Casey & Yamada, 2002; Hardy, 2009; OECD, 2001;

Whitehouse, 2000). These pensions can be used to attain different goals: providing minimum income protection during old age, safeguarding the standard of living after labour market withdrawal, or contributing to a vertical redistribution of the available income among the elderly population. In countries where public pensions are considered as earnings-related pension provision, the public pension is the most important income source for the bulk of the population. The main goal in that case is to protect the standard of living during the retirement period. However, in countries where public pensions serve as minimum income protection and only flat-rate benefits are provided, public pensions tend to be very important for those with lower incomes, but are less important for those in the higher income groups (Casey & Yamada, 2002; Hardy, 2009).

Occupational pensions, provided by the employer, are shown to be the second most important income source of the elderly population, independent from the government's involvement in their organisation and regulation. Overall, occupational pensions serve the goal of living standard protection. Minimum income protection, nor vertical redistribution of resources is considered as important in occupational pension plans. The importance of this income source in the overall retirement income package is related to the income level of the individual: employer-sponsored pensions are more important for those at the upper end of the income distribution (middle and high incomes) than for those at the lower end of the income distribution (Casey & Yamada, 2002; Hardy, 2009; OECD, 2001). This particularly is the case in countries where only a minor part of the population receives private pensions (Casey & Yamada, 2002).

With regard to financial assets, research has shown that there is no straightforward relationship between asset income and the overall income level. The bulk of the population draws in some extent on asset income, and a comparison of households within the same income groups has shown important within-group differences on the level of assets (e.g. Börsch-Supan & Reil-Held, 1997; Casey & Yamada, 2002; Venti & Wise, 2001, cited in Hardy, 2009). However, Casey and Yamada (2002) as well as Yamada (2002) found that the importance of assets in the total retirement income package increases with income: assets contribute more to the income of pensioners in the middle and high-income groups than to the income of low-income pensioners.

Further, evidence is found that the number of income sources (i.e. diversification of the income package) is related to the income level (OECD, 2001; Rein & Turner, 1999; Whitehouse, 2000; Yamada, 2002). Pensioners with a low average income are found to rely on only a single income source, mostly the public pension. In the middle-income group, pensioners still importantly depend on public pensions, but the importance, and consequently the number of other income sources in the retirement income package, grows. In the high-income group pensioners are found to combine a number of income sources, resulting in a quite diversified in cash social protection package.

2. Exploring the potential income package components within the Belgian context

In this section, detailed information is provided on the different sources available to the Belgian elderly population to protect them against the financial dimension of old age dependency. However, this is without the intention to provide an exhaustive overview of all modalities, regulations and conditions of the different components, since this information can be easily consulted in social security reference books (e.g. Agten & Asselberghs, 2009; De Brabanter, Gieselink, Petry, Roels, & Stevens, 2004; Van Langendonck & Put, 2002). Table 3.2 gives an overview of the different income sources available to the Belgian elderly population.

Table 3.2. Overview of the potential components of the income package of the Belgian elderly population

Sector	Type	
Public	Social insurance benefits	Old age pension
		Survivor pension
	Social assistance benefits	Income guarantee scheme for the elderly
	Other social transfers	Care related allowances
		Housing benefits
		Heating benefits
Occupational	Business pension plan	
	Sectoral pension plan	
Private	Life insurance	
	Personal pension savings account with tax expenditure	
	Personals savings without tax expenditure	
	Property ownership	

Where possible, statistics are presented on the importance of the different income components for the Belgian elderly population. However, it will become clear that this was only possible for a limited number of income sources, namely the public and occupational pension protection, as well as a limited number of additional publically provided benefits targeted to the elderly population. Little to no accurate information is available on the importance of private pension plans, financial assets and property ownership in the income package of the Belgian elderly population.

2.1 Public pension protection

The most important income source of the Belgian elderly population are the social insurance benefits provided by the government via the public pension system. This system is strongly employment related, in that every person who has paid social security contributions during his or her active labour market career is eligible for an old age pension. Further, in case of death, the government provides social insurance benefits to

specific categories of relatives (i.e. the surviving spouse and/or children). Both the old age pension and the survivor pension aim at protecting the standard of living via the provision of income-related benefits.

2.1.1 Public retirement pension

With regard to the retirement pension, three different pension systems have been installed in Belgium, depending on the employment statute during the labour market career: a pension system for employees, one for the self-employed and one for statutory civil servants.[13] In general one can apply for an old age pension when reaching the age of 65, although under specific circumstances an early retirement system is open from the age of 62. Further, the receipt of a retirement pension implies an important reduction in labour market activities, although the pension can be combined with a limited income from employment.

Despite the fact that the main aspiration of the retirement pension is to protect the living standard of the elderly population, the transition from a labour market income to a retirement pension always implies a reduction in the disposable income. The generosity of the retirement pension depends on a number of factors:

- the former employment statute (i.e. employee, self-employed or statutory civil servant);
- the length of the labour market career (the number of years worked);
- the income from employment during the active labour market career; and
- the composition of the household (living with or without a dependent spouse; only for employees and the self-employed).

The pension system for statutory civil servants is considered as the most generous pension system, followed by that of the employees; the public retirement pension protection of the self-employed is considered as the least generous. This stems from important differences in the pension calculation; an overview of these differences is provided in Table 3.3.

For employees and self-employed persons, on the one hand, a maximum of 45 years of work is taken into account; whenever the pensioner has worked more than 45 years, the least profitable years are left out of the pension calculation. For civil servants, on the other hand, all years worked as a statutory civil servant, multiplied by a factor of 1/60 (“tantième”) are taken into account. To a certain level, periods without employment, due

[13] For more information on the different pension systems, consult the website of National Pension Office (http://www.onprvp.be) (for employees), the National Institute for the Social Security of the Self-employed (http://www.rsvz-inasti.fgov.be), and the Pension Service of the Governmental sector (http://www.pdos.fgov.be).

to unemployment, labour market disability, career interruption, etc., are taken into account (so-called assimilated periods).

Regarding the account given to the former labour market income, for employees and self-employed persons the average wage per year worked is included in the pension calculation. The level of these wages is limited, so that those with high earnings during their labour market career will not receive similarly high pensions during retirement. This induces a certain degree of vertical redistribution of resources (cf. chapter 2). Further, these wages are revaluated to adapt them to changes in the costs of living and the welfare level. For employees, for the periods worked before 1955 flat-rate wages are taken into account; the same holds for periods of self-employment before 1984. For assimilated periods (cf. infra: periods without actual employment, but taken into account in the pension calculation) fictive wages are used in the pension calculation. Statutory civil servants, in contrast, receive a pension calculated on the average wage of the last ten years of work. Since wages tend to increase during the labour market career, this has important consequences for the generosity of the pension: retirement pensions of statutory civil servants are thus importantly more generous compared to those of employees or the self-employed with similar labour market careers.

Lastly, in the pension systems of the employees and the self-employed, the household composition influences the actual pension payment. Married pensioners with a dependent spouse (i.e. a spouse without an individual income, be it from the public pension system, from the social security system, or from employment) receive a family pension, calculated at a ratio of 75%. Single pensioners, or pensioners without a dependent spouse (i.e. a spouse with an individual income) receive a singles pension calculated at a ratio of 60%.

Table 3.3. An overview of the most important differences between the pension system of employees, the self-employed and statutory civil servants

	Employees	Self-employed	Statutory civil servants
Length of career	Number of years worked as an employee	Number of years worked as self-employed	Number of years worked as a statutory civil Servant
	Assimilated periods	Assimilated periods	Assimilated periods
	Max. 45 years	Max. 45 years	"Tantième": 1/60
Income	Average (revaluated*) wage per year worked	Average (revaluated*) earnings per year worked	Average wage of last ten years worked
	Flat-rate wage for years worked before 1955	Flat-rate earnings for years worked before 1984	
	Fictive wage for assimilated periods	Fictive earnings for assimilated periods	
Household situation	Married with a dependent spouse: 75%	Married with a dependent spouse: 75%	No account is given to the household situation
	Single or married with an independent spouse**: 60%	Single or married with an independent spouse**: 60%	

* Adapted to changes in the costs of living and the welfare level.
** An independent spouse is considered to having sufficient individual income, be it via the public pension system or via employment.

2.1.2 Minimum retirement pension and minimum right per year worked

Despite having worked before the retirement age, it is possible that the public old age pension is below a certain threshold, for example because of low wages or because the person did not work enough years. For this group of pensioners, a minimum retirement pension is organised providing them with a minimum level of old age income protection. Employees and the self-employed have to fulfil a minimum labour market condition to gain access to this minimum pension system. They have to prove at least two thirds of (full-time) employment of a complete labour market career of 45 years (i.e. 30 years). The minimum pension is thus calculated taking account the number of years worked. For statutory civil servants, the guaranteed minimum pension provides a supplement to the regular old age pension. The level of this supplement equals the difference between the real old age pension (based on the regular pension calculation) and the minimum pension threshold.

A second strategy to provide a minimum level of retirement protection to pensioners is found in the minimum right per year worked (the guaranteed minimum wage per year worked). In case the wage earned during a specific year is lower than the threshold wage, the wage used in the retirement pension calculation is raised to meet this threshold.

Consequently, the retirement pension in that case is calculated on a higher wage than actually earned during that year of the labour market career, leading to a more profitable retirement pension than would be the case when based on the actual revenues.

2.1.3 Public survivor pension

The organisation of the survivor pension is closely related to the retirement pension, though differences exist in the reasons for granting these pensions. Whereas the public retirement pension has to safeguard the living standard after labour market withdrawal at retirement age, the public survivor pension has to protect the living standard of the surviving spouse after the decease of his/her partner, and related to that, the loss of the spouse's labour market income.

As is the case in the public retirement pension system, in the public survivor pension system a difference is made between employees, self-employed and civil servants. This is based on the labour market activities of the deceased spouse. Access to the system of survivor pensions is limited. One can only apply for a survivor pension from the age of 45 (age condition), although a number of exceptions exist. For example, a surviving spouse with little children can apply for a public survivor pension before the age of 45. Further, one had to be married at least one year with the deceased spouse (marriage condition). Cohabitation does not open the right to a public survivor pension. Lastly, the receipt of a survivor pension can only to a certain extent be combined with employment income, thus the labour market activities of the surviving spouse have to be limited to apply for a public survivor pension (employment condition).

For the calculation of the survivor pension the same modalities hold as for the retirement pension, with the difference that account is given to the labour market career of the deceased spouse. The average wage during the labour market career and the number of years worked play a decisive role in the amount of the pension. The survivor pension shows to be important for a large group of older widows without a sufficient labour market career to apply for a personal retirement pension.

2.1.4 Holiday allowance

Besides the regular monthly pension payments, pensioners eligible to a retirement pension or a survivor pension also receive a holiday allowance in the month of May. For retired employees and self-employed persons the level of this allowance depends on the level of the regular pension benefits. For retired civil servants, holiday allowances are only paid to pensioners with a public pension below a specific threshold.

2.1.5 Public minimum income protection

Elderly persons with an insufficient income of their own, for example because of insufficient public pension rights, can apply for an Income Guarantee for the Elderly [Inkomensgarantie voor Ouderen], a social assistance benefit that has to guarantee minimum income protection to elderly that cannot cope by themselves, for example, because they did not perform sufficient labour market activities during their active life.

One can apply for the Income Guarantee benefit at the age of 65. Its granting depends on an extensive means-test, in which account is given to both personal income sources and income sources of other household members. To a certain extent, the Income Guarantee benefit can be combined with other income sources like a retirement or survivor pension. Further, the generosity of the Income Guarantee benefit depends on the living situation of the receiver. Elderly living alone can apply for a higher benefit than elderly living together with others. This is based on the assumption that returns of scale result from cohabitation (Van Langendonck & Put, 2002).[14]

2.1.6 Some facts and figures on the Belgian public pension protection

Some facts and figures on the public pension protection in Belgium are presented in Table 3.4. These figures refer to the situation of the retired population in 2007, and are drawn from administrative data records. The information on the population receiving a public pension is drawn from the online application from the Datawarehouse on the Labour Market and Social Security (Crossroads Bank for Social Security, 2014), while the information on the level of the public pensions is drawn from the 2010 Belgian Pension Atlas (Berghman et al., 2010).

In 2007, 64% of the population aged 60 years and over received a public retirement pension. The majority of this group was completely retired (95%), whereas about 5% combined this public retirement pension with an income from employment. On average, the public retirement pension amounted to almost 1300 Euros per month (gross, non-equivalent income) for elderly receiving a public retirement pension, not combined with other public pensions. About one fifth of the population aged 60 years and over was found to receive a public survivor pension (20%). Again, the majority of this group does not combine this with an income from employment (98%). The mean monthly gross survivor pension was 1030 Euros per month for elderly receiving only a public survivor pension. About 4% of the population aged 60 and over had an income not sufficient according to the norms of the public minimum income protection scheme in 2007, and thus received an Income Guarantee benefit for the Elderly (on average 753 Euros per month).

[14] For more information on the Income Guarantee for the Elderly, consult the website of the National Pension Office (http://www.onprvp.be), and the FPS Social Security (2011).

Table 3.4. Public pension protection: facts and figures (2007)

Type	N	%	Average level
Public retirement pension	**1606310**	**64**	
Completely retired	1530784	95	1288*
Combined with employment	75526	5	
Public survivor pension	**500618**	**20**	
Completely retired	490187	98	1030*
Combined with employment	10431	2	
Income Guarantee for the Elderly	**90392**	**4**	753¤
Unknown income	**326356**	**12**	
Total	**2523676**	**100**	

Note: All amounts refer to gross, monthly, non-equivalent pension incomes in Euros. The statistics are limited to the population aged 60 years and over.
* For pensioners receiving only a public retirement, resp. public survivor pension.
¤ For pensioners receiving an Income Guarantee benefit, whether or not combined with other public pensions.

Source: Berghman et al. (2010); Kruispuntbank Sociale Zekerheid (2014)

Note that for about 12% of the Belgian population aged 60 years and over no income information is included in the data of the Datawarehouse on the Labour Market and Social Security ("unknown income"). The assumption is that this group of elderly mainly consists of individuals without a personal income, but living together with a partner that receives a public retirement pension. Also elderly with only private means or living off his/her interest belong to this group of elderly (Crossroads Bank for Social Security, 2010).

2.2 Occupational pension protection

In addition to public pension protection, a part of the elderly population receives an occupational pension. These pensions are directly related to the former labour market situation of the individual, be it via its former employer(s) or via the labour market sector(s) in which the pensioner has worked during his/her labour market career. Special occupational pension schemes exist for the self-employed.

2.2.1 Occupational pension protection for retired employees

The government has developed a legal basis for occupational pension plans for retired employees to avoid discrimination and unfairness in the attribution of these pensions.[15] Two main types of occupational pension plans are discerned: industry pension plans and

[15] For example the 2003 Act on Supplementary Pensions (B.A. 26 mei 2003) [Wet van 28 april 2003 betreffende de aanvullende pensioenen en het belastingstelsel van die pensioenen en van sommige aanvullende voordelen inzake sociale zekerheid].

business pension plans. For both, the main goal is to protect the living standard after retirement.

Industry pension plans or sector pension plans are the result of actions of employers' organisations and workers' unions to improve the working conditions for the employees in certain labour market sectors. They aim to bridge the gap between the public retirement pension and the labour market earnings at the end of the labour market career. These plans are laid down in collective labour agreements, and have a binding character. All enterprises within the sector are obliged to follow the regulations and have to register their employees for the industry pension plan. Company pension plans, on the other hand, are developed at the enterprise level. Collective business pension plans cover the entire workforce of an enterprise, or a well-defined group of employees. No discrimination is allowed in both the access and generosity of the pension plan[16]. For example, occupational plans may not differentiate between men and women on the access, coverage and protection provided; also no difference may be made between employees in full-time or in part-time employment in access to the pension plan.

Besides these collective pension plans, under strict conditions also individual pension promises can be made to single employees. The main condition for the organisation of an individual pension plan is the existence of a collective pension plan for the entire workforce of the company.[17]

Occupational pension schemes are based on contributions paid by the employee (and the employer) during the labour market career. Unlimited payments can be made, however, this mostly is not the case since the contributions for the financing of an occupational pension plan are tax-deductible only to a certain threshold (De Brabanter et al., 2004). At the moment of retirement, and at least at the age of 60, the employee will receive an occupational pension, be it as a single lump sum payment, or as regular annuity payments. In Belgium, most occupational pensions are paid out as single lump sum payments, because of the more preferential tax treatment of lump sum payments compared to regular annuity payments.

Some occupational pension arrangements also provide additional survivor pensions and/or contain a solidarity module. Such a module protects the occupational pension built-up during specified periods of inactivity like involuntary unemployment, sickness, maternity leave, etc. The choice of the risks protected depends on the pension plan with the restriction that at least three contingencies have to be included to be recognised as a social pension plan (De Brabanter et al., 2004).

[16] Article 14 of the Act on Supplementary Pensions (B.A. 26 mei 2003).
[17] Article 6 of the Act on Supplementary Pensions (B.A. 26 mei 2003).

2.2.2 Occupational pension protection for retired self-employed persons

Individuals who are self-employed during their labour market career, have the possibility to opt in for a voluntary additional pension for the self-employed [Vrij Aanvullend Pensioen voor Zelfstandigen], providing additional income protection during old age.

These occupational pension plans are organised and offered by private insurance companies. The contributions paid are tax-deductible, be it to a certain threshold, as is the case with the occupational pension plans for employees. The pension plans can be modelled to the preferences of the self-employed person (for example concerning the risks covered, the payment modalities, etc.). It should provide additional retirement income protection, however, also additional survivor pensions can be included. Further, the so-called "social" voluntary occupational pensions for the self-employed also provided protection in case the self-employed individual is confronted with disability, decease, bankrupts, etc. (Van Eesbeeck & Vereycken, 2004).

In addition to the voluntary additional pension for the self-employed, self-employed company managers can draw on a number of other occupational pension schemes, mostly in the form of individual pension promises from the company to the manager (Van Eesbeeck & Vereycken, 2004). The individual pension plans can be combined with a voluntary additional pension for the self-employed.

2.2.3 Some facts and figures on the Belgian occupational pension protection

Little accurate information is available on the importance of the occupational pension protection for the Belgian elderly population. Until recently, no central databank existed with information on occupational pensions in Belgium. As a reaction to this, in 2011 the Databank on supplementary pensions (DB2P) was launched, collecting information on different aspects of occupational pensions (both built-up and payment of occupational pensions).[18] However, it is not yet possible to extract statistics from this database to investigate the importance of occupational pensions for Belgian pensioners. We thus collected some facts and figures from other data sources to illustrate the role of occupational pension protection in the old age income package of Belgian pensioners (Table 3.5).

[18] For more information on the Supplementary Pensions Database, consult the website: http://www.db2p.be

Table 3.5. Occupational pension protection: Facts and figures (2007)

Type	N	%	Average level
Occupational pension for employees	205457		575
Annuity payments	38841	73	
Lump sum payments	149049	19	
Combination of annuity and lump sum	17940	9	
Occupational pension for self-employed	2916		
Annuity payments	870	30	3800
Lump sum payments	2046	70	25000

Note: The occupational pensions for employees refers to retired employees receiving only a public retirement pension, combined with an occupational pension. The average level includes both the annuity and the lump sum payments (converted to fictitious annuities), and refers to gross monthly payments in Euros. The occupational pensions for the self-employed refer to the self-employed retired in 2007. The annuity payments refer to gross annual payments.

Source: Berghman et al., 2010; Banking, Finance and Insurance Commission, 2009

In 2007 205457 retired employees, or 35% of the total population of pensioners with an employee retirement pension, received an occupational pension. More than 70% of this group opted for a lump sum payment, while about 19% received (and still receives) his/her supplementary pension as an annuity payment. On average, the occupational pension contributed 575 Euros per month to the income of the elderly population (lump sum payments were transposed to fictitious annuities).

For elderly receiving a public self-employment retirement pension, information was only available for self-employed individuals that retired in 2007. Based on the bi-annual report of the Banking, Finance and Insurance Commission (2009), in 2007 about 14% of the retired self-employed elderly population received a voluntary additional pension for the self-employed. The majority of this group opted for a single lump sum payment (on average 25000 Euros), while about 30% chose to receive the occupational pension in the form of regular annuities (on average 3800 Euros per year).

2.3 Fiscally stimulated private pension protection

Private pension plans are the result of an agreement between the individual and a private insurance company offering additional pension protection at old age. Two main types of private pension plans are discerned: the individual pension savings account, and the individual life insurance. Both have a certain legal basis, in that the Belgian government provides tax exemptions for savings made via these arrangements.

In an individual pension savings account, annual deposits are made, and the accumulated capital (annual deposits + annual interest) can be withdrawn at the age of 65. Tax exemptions are provided for the annual deposits, whenever they do not exceed a fixed threshold. These tax exemptions have to promote individual pension savings and stimulate the population in contributing to their own old age income protection. Overall, the pension is paid out as a single lump sum payment, although the beneficiary is free to

opt for regular annuity payments. Obviously, only elderly who have contributed to such an individual pension plan can profit from it during old age.

Another fiscally stimulated savings product is the individual life insurance, that can be contracted to provide an additional income when reaching old age. Tax exemptions are available for individual life insurance plans with a guaranteed return. Individual life insurance plans without a guaranteed return are not eligible for such tax exemptions. Further, the insurance premiums paid are only taken into account when not exceeding a certain threshold, which takes account of the individuals' income.

Some facts and figures on the Belgian fiscally stimulated private pension protection

Little to no accurate information is available on the (former) participation of the Belgian elderly population in fiscally stimulated private pension schemes. Research based on administrative data from tax declarations indicates that in 1998 about 26% of the unmarried population and 58% of the married couples contributed to a fiscally stimulated private pension plan (Gieselink, Peeters, Van Gestel, Berghman, & Van Buggenhout, 2003).

Overall, individual life insurance schemes proof to be a little more popular than individual pension savings accounts. Note, however, that this information concerns the contributions made for the build-up of a private pension. No information is available on the beneficiaries, or to put differently, on the elderly population that has received a private pension from fiscally stimulated private pension schemes.

2.4 Financial assets

Whereas the private savings discussed in the previous section are fiscally stimulated via tax expenditures, individuals and households are free to save a part of their income in a savings account or via (long-term) investments.

These savings and investments can have different motives, either or not explicitly focused on providing additional old age income protection (Keynes, 1936, cited in Browning & Lusardi, 1996). For example, the classical precautionary motive ("to build up a reserve against unforeseen contingencies") and the life-cycle motive ("to provide for an anticipated relationship between the income and the needs of the individual") can be considered as savings motives that contribute to one's old age wealth. The wealth accumulated via savings has an important contribution during old age, not only because financial means are provided to safeguard one's standard of living, but also because an economic buffer is available to pay for unexpected financial costs (Casey & Yamada, 2002; Hardy, 2009; Sierminska, Frick, & Grabka, 2010).

With regard to financial assets, a difference can be made between the accumulated assets and the interests and dividends received from these assets (the so-called financial asset

income). The interests and dividends can be considered as part of the current income, since they are available for direct consumption (Expert Group on Household Income Statistics, 2001). The assets and capitals themselves do not have an immediate, but a postponed contribution to the disposable income in that, for example, they provide a financial back-up for unexpected circumstances. This possibility of wealth decumulation during old age makes it interesting to include them in the old age income package. Moreover, asset wealth can induce a certain consumption behaviour, since a positive relationship is found between the asset stock and the consumption (Blake, 2004; Skudelny, 2009).[19] For the elderly population this could be important because, for example, elderly with a large assets stock have the potential to spend more on care services than elderly with a small assets stock (cf. chapter 4).

2.5 Property ownership

A last possible source in the old age income package refers to property ownership, which included ownership of both property for living and property for rental purposes. Property ownership holds a rather specific position in the old age income package, firstly because it mostly does not have a direct contribution to the old age income, and secondly, because it finds itself between the public and private sphere of welfare protection (Dewilde & Raeymaeckers, 2008; Kemeny, 2001). Nevertheless, the contribution of property ownership to old age income protection cannot be neglected. According to Kemeny (2001, p. 53) "it has always been recognised as comprising a key aspect of everyday life, closely associated with security and with health and well-being.". Further, for (mortgage free) home ownership, the exempt of rent payments makes that the disposable income of home owners essentially is larger than that of renters (Ritakallio, 2003), which could be particularly important for elderly falling back on a lower income after retirement.

Home ownership can be regarded as a kind of private pension insurance, in addition to other old age income sources (Dewilde & Raeymaeckers, 2008; Kemeny, 2005). However, wide discussions exists on whether or not housing wealth can be or should be considered as part of the disposable income. Housing itself is often not considered as a potential source of income, since it serves numerous other functions like feeling at home, having a place for family, belonging to a community, having access to services and facilities, etc.,

[19] For example, according to an analysis of SHARE data by Cápeau and Pacolet (2009), elderly in Belgium spend more on consumption goods than elderly in the Netherlands, despite their lower net incomes. One explanation for this is found in the life cycle saving hypothesis: "possibly older Belgian people have succeeded, for whatever reason, in saving more during an earlier phase of the life cycle, so that they can guarantee a higher consumption level than their current income would indicate." (Cápeau & Pacolet, 2009, p. 28). An alternative explanation is found in mortgage-free home ownership, which reduces the costs of the older population, leaving a higher income available for consumption goals.

that outweigh the possible income function. To illustrate, a study on the housing needs of the Flemish elderly population, based on the 2005 Flemish Living Survey, has shown that elderly are not very keen to move or sell their house, since this often also implies changes in the living neighbourhood and social networks (Myncke & Vandekerckhove, 2007). This also has been found in international research (e.g. Venti & Wise, 1990; Walker, 2004): elderly are not very willing to move or sell their house to collect the wealth related to it, although it does happen when unexpected events occur (like the death of a partner).

Despite these discussions, taking account of home ownership proofs to have an important effect on old age poverty (e.g. Dewilde & Raeymaeckers, 2008; Fahey, Nolan, & Maïtre, 2004; Ritakallio, 2003): the at-risk-of-poverty rate of the elderly population tends to decrease when housing is taken into account. This can mainly be attributed to home ownership: "(…) outright owning is really the major factor accounting for the big difference between before- and after-housing-costs poverty figures." (Ritakallio, 2003, p. 95). However, the poverty reducing effect of home ownership is moderated by Fahey et al. (2004) in that only when the cost of housing counts heavily in the disposable income, home ownership can actually influence the at-risk-of-poverty rate.

In Belgium, the government plays an important role in stimulating home ownership and in providing decent housing to the population. Different strategies are at hand (Deleeck, 2001; Ritakallio, 2003). Housing loans arranged after January 2005 give the right to a tax exemption for "single and proper home ownership" in the personal income taxing system, the so-called housing bonus [woonbonus] for mortgage loans with a duration of at least ten years for the financing of a unique and personal property. Mortgage loans contracted before 2005 gave right to several types of tax relief, like interest deductions, tax credits for capital redemption payments and a dwelling allowance (FOD Financien, 2014; Verbist & Lefebure, 2008). (Low-income) Households can apply for a social loan at more advantageous interest rates for the purchase of a house. The preconditions to qualify for a social loan differ and relate to the value of the property, the household composition, and the household income.

Whereas property as such does not have an immediate contribution to the disposable income during old age, one strategy – the reverse mortgage strategy – could be considered to convert the property's value into cash. Reverse mortgaging implies that the estimated housing wealth is transposed to a regular annuity. Account is given to the property value, the remaining mortgage, and the life expectancy of the owner(s). In doing so, the property wealth can be consumed during the retirement phase, and can provide an actual contribution to the income from other old age income sources like pensions. However, until now reverse mortgaging is not yet possible in Belgium, though political initiatives have been taken to install such a system. A first notice of the possibility of reverse mortgaging was made in a policy document of Verwilghen in 2006. Reverse mortgaging was put on the agenda as an initiative to allow elderly to release the wealth accumulated in their property and to use this for other goals, without losing the property for living. A first bill was introduced in 2009 to install a reverse mortgage [omgekeerd woonkrediet/pensioen krediet] to allow pensioners to transpose their housing wealth into

regular annuity payments (DOC 52 2152/001) (De Block, Schiltz, Staelraeve, & Defreyne, 2009). This bill was again introduced in 2011 (DOC 53 1229/001) (De Block, 2011). However, until now it has not been adopted.

2.6 Conditional public cash transfers

Besides the public retirement and survivor pensions and the social assistance for the elderly population, the government provides a wide range of conditional cash transfers, either or not targeted specifically to the elderly population. These transfers are conditional in that specific conditions are attached to the spending of the cash. Three broad categories of conditional cash transfers for the elderly population are distinguished: care related benefits; housing benefits; and heating allowances.

2.6.1 Care related benefits

The first category consists of a number of financial compensations provided by the government to elderly with specific care needs. To receive these benefits, the elderly person has to prove a certain level of care dependency or the existence of a certain care need. The cash transfer has to compensate for the additional cost of care dependency, though the actual receipt of care does not always has to be proven.

Disability benefits

The most important allowance in this category is the benefit for assistance to the elderly [tegemoetkoming voor hulp aan bejaarden], which is granted to low-income, disabled persons aged 65 and over facing a severe reduction in their autonomy and problems with activities of daily living. The benefit for assistance to the elderly has to compensate for additional costs due to the person's disability, though the actual additional costs for the receipt of care do not have to be proven. The generosity of this benefit depends on the person's income and on his/her degree of autonomy (FOD Sociale Zekerheid, 2011).[20]

Besides this age related benefit for assistance to the elderly, elderly persons receiving an integration benefit [intergratietegemoetkoming] or an income replacement benefit [inkomensvervangende uitkering] before the age of 65, keep on enjoying this benefit after the age of 65. Both are granted to disabled persons younger than 65 years. The integration

[20] For more information on the allowance for assistance to the elderly, consult the website of the federal Directorate General Disabled Persons (http://handicap.fgov.be), and the FPS Social Security (2011).

benefit depends on the degree of dependency and takes account of the income of the disabled person. It is granted to compensate for the limitations of one's handicap in the activities of daily living, or to compensate for a certain loss in the ability to live independently. The income replacement benefit on his turn has to compensate for the loss of income generating capabilities due to one's handicap (i.e. not or only partly being able to take part in the labour market). The benefit itself takes account of the household income of the disabled person (Van Langendonck & Put, 2002).

Long-term care benefits

In Flanders, a specific long-term care benefit – the Flemish care insurance [Vlaamse zorgverzekering] – has been installed for persons confronted with long-term care needs. This long-term care insurance is not specifically targeted to the elderly population, but because of the link between age and the risk on long-term care dependency, long-term care insurance benefits are particularly important for the elderly population.

The benefit has to compensate for the non-medical costs resulting from the long-term care needs, either provided at home or in a long-term care institution. However, the actual costs do not have to be proven to receive the care benefit, only a certain degree of care dependency is taken into account. When eligible for the Flemish care insurance, a flat-rate monthly benefit is paid to compensate for both formal and informal care. Only those living in Flanders, and in Brussels when they have joined the care insurance scheme, can apply for benefits via this long-term care insurance scheme.

Note that, while in Flanders participating in the long-term care insurance is obligatory, it is voluntary for individuals living in the Brussels Capital Region. (Vlaams Agentschap voor Zorg en Gezondheid, 2010).[21] Until now, this type of public financial compensation for the receipt of long-term care only exists in Flanders. No alternative is organised in the other Belgian regions (Pacolet et al., 2004).

Home care benefit

A third group of care related benefits involves the care benefits provided by local authorities (e.g. municipalities) to compensate for the financing of (informal) home care. These benefits are known under different names, like the home care allowance, informal care allowance, etc.

[21] For more information on the Flemish Care insurance, consult the website of the Flemish Agency for Care and Health [Vlaams Agentschap voor Zorg en Gezondheid] (http://www.zorg-en-gezondheid.be).

This benefit is paid either to the informal care giver or to the care receiver. The application conditions differentiate between municipalities, however, most conditions concern the place of residence of the care receiver and/or care giver, the degree of care dependency, the income of the care receiver, and the age of the care receiver (Pacolet et al., 2004; Ziekenzorg CM, 2012). Also at the level of the Flemish Provinces (more specifically in Antwerp, East-Flanders and Limburg), informal long-term care benefits are paid to compensate informal care givers (Ziekenzorg CM, 2012).

Facts and figures about the conditional public cash transfers

An attempt was made to gather some statistics on the importance of the previously discussed conditional public cash transfers for the Belgian elderly population.

Firstly, based on administrative data from the Crossroads Bank of Social Security (2014), we found that in 2007 154606 elderly aged 60 years and over received some kind of disability benefit. This implies that about 6% of the elderly population receives such benefits.

Secondly, statistics from the Flemish Agency for Care and Health (2013) indicate that in 2007 148051 elderly aged 65 years and over received a long-term care benefit. This corresponds to about 10% of the Flemish population older than 65 years. Or, to put it differently, about 80% of all long-term care insurance benefits are granted to individuals aged 65 years and over.

Thirdly, with regard to the home care benefit, a study conducted by one of the leading Belgian Health Services (Ziekenzorg CM, 2012) showed that in Flanders in 2012 in about 80% of all Flemish municipalities an informal home care benefit was granted, covering about 32000 individuals receiving home care. This is an underestimation of the actual number of beneficiaries, because information was not available for all Flemish municipalities. In 70% of the municipalities with an informal home care allowance, age conditions are coupled to the receipt of this allowance. This implies, among others, the fact that the care receiver should be 65 years or older. In four municipalities the informal home care allowance is targeted specifically to the care dependent population aged 65 years and over. An additional home care benefit is granted by the Provincial authorities in Antwerp, Limburg and East-Flanders. In Antwerp and Limburg this home care benefit is targeted to elderly care receivers.

2.6.2 Housing benefits

A second category of conditional public social transfers consists of a range of housing benefits, mostly not specifically targeted to the elderly population. These allowances differ

between the Belgian regions, since housing policy was granted to the Belgian regions after the state reform in the 1980s.

In Flanders, housing benefits are granted to individuals moving from bad housing to better, adapted housing. The rental subsidy [Vlaamse tegemoetkoming in de huurprijs] combines a single flat-rate settling subsidy [installatiepremie] and a monthly rental allowance [huurtoelage]. The settling subsidy is granted to low income tenants moving from a bad to a better accommodation. In addition, these tenants can also apply for a monthly rental allowance. The receipt of these housing benefits is limited in time, although this precondition is abolished for the elderly population. The amount of the benefit takes account of the income of the applicant (Agentschap Wonen-Vlaanderen, 2010).

In Wallonia, a similar housing benefit exists for persons moving from insufficient to adequate housing (Service Public de Wallonie Département du Logement, 2011). As is the case in Flanders, the "moving and rental allowance" [allocation de déménagement et loyer] combines a single flat-rate moving subsidy [allocation de déménagement] and a monthly rental allowance [allocation de loyer]. However, important differences exist between the housing benefits in Flanders and Wallonia with regard to the income conditions and the amount of the benefits provided.

2.6.3 Heating allowance

A third category of social transfers involves the heating allowances, that have to cover for high heating costs. Elderly with a guaranteed old age benefit granted before 2001 receive a special heating allowance [bijzondere verwarmingstoelage]. This allowance is flat-rate, takes account of one's living situation, and is paid in the month of February.[22]
Elderly not eligible for the special heating allowance, because they do not receive a guaranteed old age benefit granted before 2001, can apply for a heating allowance via the Social Heating Fund [Sociaal Verwarmingsfonds] when they are eligible for an Income Guarantee allowance. The heating allowance is flat-rate, and depends on the price paid at the moment of fuel delivery. Compensation is provided only for the purchase of fuel oil, not for the purchase of natural gas.[23] This heating allowance is not specifically designed for the elderly population, since all low-income households can apply for compensations via the Social Heating Fund.

[22] For more information on the special heating allowance, consult the website of the National Pension Office (http://www.onprvp.be).
[23] Detailed information can be consulted on the website of the Social Heating Fund (http://www.verwarmingsfonds.be/).

3. Determinants of the old age income package

In the previous sections the potential components of the old age income package were discussed. Now, we turn to the factors influencing the actual composition and protection provided by the old age income package. The focus is on the following determinants, that could explain the differences in the old age income package among the elderly population:

- sex and gender, since women tend to be less well off than men;
- age, since the oldest elderly tend to be less well off than younger groups of elderly;
- labour market history, because of the strong link between pensions and previous wages and between public and private (i.e. employer-sponsored) pensions and working history;
- socioeconomic status, since those with a higher socioeconomic status are found to enjoy higher levels of protection compared to those with a lower socioeconomic status;
- marital status and household composition, since important differences exist between (married) couples, the single, the widowed and the divorced; and
- health and functional status, since the receipt of certain benefits depends on one's health and functional status.

3.1 Sex and gender

In an important part of the research literature, gender differences in (old age) in cash social protection are put in the forefront. These differences are not specific for the elderly population, but can be found in the entire population. Gender differences in old age are thus said to be a mere reproduction of existing inequalities between men and women during their active live phase (e.g. Ginn, Street, & Arber, 2001; Ginn, 2003; Hardy, 2009; O'Rand & Henretta, 1999).

With regard to public pension incomes, gender differences are found in the generosity as well as in the coverage of the public pension systems (e.g. Casey & Yamada, 2002; Heinrich, 2000; Levine, Mitchell, & Phillips, 1999; O'Rand & Henretta, 1999; Smeeding & Sandström, 2005; Williamson & Smeeding, 2004). Both are found to be significantly lower for women than for men. Overall, women tend to be less covered by the public pension system, and when they are covered, the level of protection tends to be lower. Explanations for this are sought in the strong link between public pensions systems, work history, marital history and family formation. Given "the earning-related structure of social security systems, together with the traditional division of labour between the sexes", these gender differences are structurally built into European public pension systems (Leitner, 2001). As discussed before, public pensions are often strictly linked to the individual's work history. On the one hand, access to the public pension systems depends on the social security contributions paid (based on formal employment). On the other hand, the benefit

level depends on the number of years worked in formal employment and on the wages earned during this period of employment. The strict coupling between labour market participation and public pension protection disfavours women, in that the current generation of female pensioners often was not or only temporarily in formal employment during their active life phase. After all, these women were at active age in the 1950s and 1960s when the male breadwinner model was dominant. Male employment outside the house and female housework was considered as the standard, so that these women often only knew a short or very fragmented period of paid employment (Ginn et al., 2001; O'Rand & Henretta, 1999; Sefton, Evandrou, Falkingham, & Vlachantoni, 2011). However, several mechanisms have been built into the public pensions systems to compensate for the unpaid homework mostly done by women. For example, career interruptions can (partly) be taken into account when calculating pensions, and the same holds for periods of part-time employment (Leitner, 2001) (cf. supra: assimilated periods).

Concerning the receipt of old age social assistance, it is found that women more often than men fall back on old age social assistance benefits, mainly because they do not have sufficient (pension) incomes of their own (Ginn & Arber, 1999). This has important consequences for the protection provided by the income package of the female part of the elderly population, since social assistance benefits serve to provide minimum income protection and thus on average provide lower levels of income than retirement pensions. This also links up with the observation that, among the elderly, women tend to have a higher poverty risk than men (e.g. Hardy, 2009; Smeeding & Sandström, 2005; Whitehouse, 2000).

These gender differences are also found in the private pension provision. Different authors (e.g. Bardasi & Jenkins, 2010; H. Ginn & Arber, 1999; J. Ginn et al., 2001) show that in the UK the proportion of women receiving a private pension is smaller than the proportion of men receiving such a pension. Several explanations are put forward for this: the overrepresentation of women in part-time work, in temporary contracts, in casual employment, in less favourable sectors of employment, etc.[24] Further, not only do women have less access to private pensions, when they have access to these systems, their benefits are often significantly lower than those of their male counterparts. Again, the main reasons for this are found in their work history: lower earnings, a lower number of years worked, having worked in sectors without sector occupational pension provisions, a lower occupational status, etc. (e.g. Ginn & Arber, 2001; Ginn, 2004; Moffat & Luckhaus, 1998). Or as Ginn and Arber (1999, p. 321) put it: "Designed for middle class men's pattern of continuous full-time employment, occupational pensions translate women's labour market disadvantages into low personal income in later life.". This gender inequality in private pensions is especially alerting given the increasing call for pension

[24] All explanations for the less favourable private pensions of women are related to their labour market situation. This is obvious, since private pensions are very often conceived as occupational pensions, provided by the employer or by the sector of employment.

privatisation to tackle problems with the financeability of the public pension schemes. Pension inequality between men and women and female poverty among the elderly is expected to rise whenever a radical shift from public to private pensions is made (e.g. Bardasi & Jenkins, 2010; Frericks, Knijn, & Maier, 2009; Ginn, 2004).

As regards financial assets, it is expected that the differences between men and women are smaller, since financial assets are pooled within households. However, for singles, important differences are found between men and women (e.g. Deere & Doss, 2006; Denton & Boos, 2007; Sierminska et al., 2010; Warren, Rowlingson, & Whyley, 2001). Single men overall tend to have accumulated more financial assets than single women at the moment of retirement, consequently enjoying a higher degree of income protection from these sources. This difference between men and women often is traced back to pre-retirement gender differences in that women, due to lower earnings, interrupted labour market careers, and working in less favourable occupational sectors, are found to have less opportunities for wealth accumulation than their male counterparts. However, also the gender difference in risk preference is put forward to explain gender differences in asset accumulation: because women tend to be more risk averse than men, they more often miss out on high investment returns, leading to lower accumulated financial assets (Sierminska et al., 2010).

In line with the link between gender and financial assets, also for property assets an advantage for men in comparison with women is found. Overall, men have higher labour market earnings and a more stable labour market career than women, and thus they have more opportunities to obtain housing tenure. This is specifically important for singles, since in couples housing wealth is expected to be pooled among both partners (Hood, 1999).

3.2 Labour market history

In the previous section, reference has been made to the importance of work and labour market history as an additional factor explaining differences in the income package of the elderly population. Specifically in countries where a strong link exists between labour market participation and pension systems, labour market history plays an important role in later life income protection. Not only earnings during the active labour market career, also one's occupational status, the length of the employment career, whether or not one has experienced (numerous) career interruptions, the labour market segment, etc. influence the access to and the coverage provided by the different income sources.

The importance of early life events in later life income protection is also acknowledged in the life course perspectives on ageing and social stratification in old age (Elder, 2007). Human development is conceived as a lifelong process of events and actions shaping the entire life course of individuals. Choices made during the life course keep on posing their influence throughout life. Obviously, individuals do not act in a vacuum: the life course is embedded in history and place. Furthermore, individual life courses are found to mutually

interact, leading for example to the fact that one's life course to a certain extent is influenced by that of his/her parents. Within this viewpoint, theories on status attainment have substantiated that even in old age, when individuals in general are no longer active on the labour market, the former occupational position keeps on posing its influence (Riley, Foner, & Waring, 1988, p. 250). Consequently, labour market inequalities (during the active life phase) are persistent throughout the post-retirement life phase. Three perspectives on status attainment have been developed, differing in the strength of the relationship between the pre- and the post-retirement life: status maintenance, status levelling and status divergence. In the status maintenance perspective, it is assumed that social status is built up during the life course, and keeps – unchanged – exerting its influence during old age. "Resources and rewards obtained early in the life course, particularly in the transition from education to work, have persistent effects over time and serve to maintain individuals' relative status within cohorts." (O'Rand & Henretta, 1999, p. 9). Existing inequalities are reproduced with the transition from the active life into retirement. This implies that social security mechanisms do not succeed in removing active life inequalities. The second perspective, the status levelling perspective, makes a less strong link between active life status and old age social status: inequalities in the old age life phase tend to be less pronounced due to public policy actions intervening in old age inequality (O'Rand & Henretta, 1999). The last perspective, the status divergence or cumulative disadvantage perspective, assumes that the transition from the active life to retirement goes hand in hand with growing inequalities among the elderly, mainly because of an increase in the importance of resources that are unequally distributed among the elderly population (O'Rand & Henretta, 1999). Inequalities are cumulated throughout the life course, leading to the reproduction of advantages and disadvantages. This has been called the Matthew-effect: the rich get richer, the poor get poorer (Dannefer, 1987, 2003).

The strong link between the labour market and the old age income package largely stems from the fact that the calculation of pensions strongly builds on the former labour market career. For the calculation of Belgian public old age pensions account is given to the labour market statute (employee, self-employed, or statutory civil servant), the length of the labour market career (number of years worked) and the average earnings during the labour market career. Consequently, whether or not one has gaps in his or her labour market career, received only low wages, or worked primarily as an employee or was self-employed, has important consequences for the income protection provided via the public old age pension system. To a certain extent, gaps in the labour market career are covered via a system of assimilated periods: periods in which the individual has not worked, but which are nevertheless included in the pension calculation. This holds for, among others, periods of involuntary unemployment, sickness, career interruptions and time-credit, and part-time work (cf. supra). For these periods, the pension calculation is based on a fictitious wage, that normally corresponds to the average wage of the preceding year. However, gaps in the labour market career not covered via this system of assimilated periods (for example voluntary unemployment, voluntary part-time work, etc.) give the individual no entitlement to pension rights, thus having important consequences for

his/her future pension claims. Further, labour market interruptions also have consequences for the access to the system of minimum pension protection. Since access to the minimum pension is only granted when meeting the requirements on the length of the labour market career, pensioners with important periods of labour market absence might not qualify for a minimum old age pension.

Also for occupational pensions, work history plays an important role. Access to occupational pension plans depends on the labour market statute, the labour market sector and the size of the organisation. Employer-sponsored benefits are often available to only a limited group of employees, related to their position on the labour market, their earnings and the skills required for the job (O'Rand & Henretta, 1999). For Belgium, research of Gieselink et al. (2003) found that company executives have more access to occupational pension plans than white-collar workers, who on their turn have more access than blue-collar workers. Further, differences between labour market industries were found, depending on, among others, the financial capacities of the sector, the knowledge, and whether or not industry pension arrangements were set up (Peeters, Van Gestel, Gieselink, Berghman, & Van Buggenhout, 2003). Lastly, occupational pension plans were found to be significantly more organised in large companies than in small companies, possibly because of the administration costs related to the organisation of an occupational pension plan. Similar results on the relationship between labour market history and the access to occupational pension plans was found in the United States (Hardy, 2009), the United Kingdom (Bardasi, Jenkins, & Rigg, 2002), and Norway (Hernaes, Piggott, Zhang, & Strom, 2011). Concerning the generosity of these occupational pensions, a strong link between the occupational pension benefit and the previous wage is found (e.g. Bardasi et al., 2002; Hardy, 2009; Peeters, Debels, Verschraegen, & Berghman, 2008). Whether they are considered as defined benefit plans or as defined contribution plans, occupational pensions always to a certain extent reflect the previous earnings. Also, in the calculation of the occupational pension account is given to the length of the labour career (the contributions paid reflect the number of years worked). This works out badly for those in part-time employment or with lower overall earnings, who have contributed less to the occupational pension plan. Lastly, those with and incomplete labour market career, because of career interruptions or (involuntary) periods of unemployment, will have lower occupational pensions than those with a complete labour market career (given that both have access to an occupational pension).

For the other income sources in the old age income package, the link with former labour market participation is less direct. Both private pension plans, and financial and property assets are built up largely during the active life course. Higher labour market earnings and a higher employment status go hand in hand with more possibilities for savings, and thus for building personal pensions and accumulate financial and property assets. This is quite obvious, since, given equal spending on indispensable goods, those with a higher labour market income can save a larger part of their income than those with a lower labour market income. This active life accumulation of resources is, at least partially, transposed

to the post retirement phase, thus resulting in old age differences in the income package based on pre-retirement labour market differences.

Lastly, it should be noted that one cannot reflect on the influence of the labour market history without taking into account the gender differences in labour market participation: Women tend to differ importantly from men with regard to their work biography. On average, they have shorter and more often interrupted labour market careers, higher unemployment levels, a higher frequency of part-time employment, lower wage rates, and an overall lower degree of occupational stability. This results in a lower degree of pension built-up in both public and occupational pension systems. On the other hand, it leads to lower pension benefits (both public and occupational) at the moment of retirement (e.g. Bardasi et al., 2002; Frericks et al., 2009; Peeters et al., 2008; Sefton et al., 2011; Shuey & O'Rand, 2006). Because of lower labour market earnings, also the opportunities for asset accumulation are found to be more limited for women than for men, though this is largely compensated via the pooling of income sources within couples. For singles, nevertheless, it could lead to important differences in accumulated assets between men and women (cf. supra).

3.3 Socioeconomic status

Socioeconomic status is considered to be a seminal stratification determinant. This multidimensional concept combines income, education and occupational status to explain societal inequalities (Rogers & Saint Onge, 2007). It is generally assumed that those in employment, with a higher level of education and a higher income are better off than those without employment, with low educational levels and with low income. Here also the status attainment theories are applicable, in that active life socioeconomic status is found to influence importantly the individuals' retirement living situation. Because the link between one's retirement income and former labour market participation is already discussed in the previous section, in this section the focus is on the impact of one's level of education on the old age income package.

As was the case with former labour market participation, the influence of education is considered from a life course perspective. Education is found to remain fairly constant throughout the life course, resulting in a certain degree of continuity (Dowd, 1980). It is conceived as "a pivotal mechanism governing social mobility and socioeconomic attainment" (Mare, 2001, p. 480), an early life event (or transition of events) that keeps on posing its influence throughout the rest of the life course. Given the strong link between education and occupation on the one hand, and occupation and old age in cash social protection on the other hand, education indirectly influences the old age income package. Or, as Hardy (2009, p. 494) puts it: "education is a significant factor in determining occupation as well as wages and salaries within broad occupational categories, [thus] it is also related to differences in income and wealth [in old age]".

For public retirement pensions, no important differences are expected to exist between low and high educated individuals concerning access to the public pension system, since the old age pension is available to all that have paid sufficient social security contributions (cf. supra). However, given the link between education, labour market participation and occupational status, it is expected that the generosity of the public pension benefits will increase with the level of education, under the assumption that labour market earnings increase with level of education. However, given the restrictions in the level of retirement pensions (cf. supra), this only holds until a certain point; from that point onwards pensioners will receive the same public pension despite any differences in the contributions paid. Regarding old age social assistance, it is expected that an overrepresentation of low educated elderly receives an old age social assistance allowance. After all, old age social assistance is only granted to those without sufficient individual pension rights, thus, to elderly who did not (sufficiently) participate in the labour market. Again it is expected that the risk on not participating in the labour market is higher for those with a low level of education. Further, even when included in the labour market, those with a low level of education are found to be overrepresented in labour market segments with lower wages, less stable careers, more part-time and temporary employment, etc., resulting in a lower built-up of public pension rights.

With regard to occupational pensions, both coverage and generosity are correlated with the individual's level of education (O'Rand & Henretta, 1999). Again, this is mainly attributed to the link between education and occupational status, since those with a higher level of education are found to have a higher occupational status, that on its turn is associated with a higher coverage and more generous occupational pension payments. Research confirms this, and what's more, showed that occupational pensions are a tool for those with a high socioeconomic status to increase their retirement income (Ginn & Arber, 1999).

Similarly, private pension plans and financial assets are found to be more important for those with a higher level of education. Research based on EU-SILC data (Van den Heede, Van Den Bosch, & Cantillon, 2010) showed that in Belgium the incidence of having a savings account, stocks, or bonds increases with the level of education. In addition, research has shown that those with a higher level of education accumulate more financial assets than those with a lower educational degree (e.g. Browning & Lusardi, 1996). Different explanations could account for this: a higher level of education is generally related to a better occupational position, thus creating more opportunities for asset accumulation; a higher level of education can be associated with more financial knowledge and less risk aversion for financial investments; etc. Further, a positive relationship between income, asset ownership and the amount of financial assets has been found (e.g. Browning & Lusardi, 1996). In the higher income groups, asset ownership was found to be more widespread than in the lower income groups. The amount of financial assets accumulated also proved to be larger for those with higher incomes than for those with lower incomes, again because, given an equal spending on indispensable goods, a higher

income creates more opportunities for saving than a lower income (Bardasi & Jenkins, 2010).

3.4 Marital status and household composition

A last determinant of income inequality among the elderly population, that is often considered in the literature, refers to the marital status and the household composition (living arrangements). Whether an individual is married, divorced or widowed has important consequences for his or her old age income protection. The same holds for the household composition; for example whether or not a single individual lives together with adult children, or one lives together with a partner influences importantly his or her in cash social protection. After all, it is shown that living together with others bring about important economies of scale. Further, cohabitation is an important buffer against poverty, since resources and risks are pooled within the household, thus resulting in a kind of shared financial safety net (e.g. Casey & Yamada, 2002; H. Ginn & Arber, 1999; Hardy, 2009).[25]

In the public pension system marital status and household composition is taken into account for the calculation of the pension benefits. Firstly, with regard to retirement pensions of employees and the self-employed, the benefit level differs with marital status. The old age pension of married elderly with a dependent spouse, without sufficient individual pension rights, is calculated at a ratio of 75% of the former average wage (cf. supra). For single pensioners, or pensioners married with a spouse that is entitled to a personal old age pension, the old age pension is calculated at a ratio of 60%. The higher ratio which is taken into account for married pensioners with a dependent spouse has to compensate for the fact that this spouse has no personal pension entitlements.[26] It is expected that couples where both partners receive a public retirement pension, calculated at the 60% ratio, will be in the most advantageous financial situation. Secondly, for widowed pensioners the state provides a survivor pension, that is based on the labour market career of the deceased spouse. Thirdly, a number of specific arrangements have been set up for divorced pensioners, compensating for periods of unemployment during the marriage. For ex-partners of employees and self-employed persons, a divorce pension

[25] Very often, in the literature marital status is linked with gender, and a focus is put on the differences between men and women in relation with their marital status. Traditionally, different roles are ascribed to men and women whenever they get married, resulting in, among others, differences in their labour market participation: men tend to work in full-time, continuous employment, while women are often not or only in part-time employment, and are often confronted with career breaks for child bearing (so-called "specialisation within the marriage": Yabiku, 2000). In later life, this brings about important differences in the protection provided via both the public pension system and the private (employer-sponsored) pension system.

[26] Note that in the public retirement pension system for statutory civil servants no account is given to the marital status. No difference is made between married and single pensioners.

is granted if the individual did not work during the marriage, and thus did not built up personal pension rights. This pension is calculated on the labour market career of the ex-partner during the marriage. However, the divorce pension tends to provide only low levels of income protection, leading to a situation in which divorced women overall are in the worst financial situation. Even more than widowed women, they tend to fall back on social assistance benefits. For these women, cohabitation (with adult children) has proven to be an important buffer against poverty: single women living alone face a higher risk of low income than single women living together with others (Bardasi et al., 2002; Casey & Yamada, 2002).

Occupational pensions on the other hand, do not take account of the living situation. Provisions can be included in these pension plans to provide protection to surviving spouses. In this case, occupational survivor pensions are provided based on the occupational pension of the deceased spouse. When also account is given to gender, interesting differences are found between single versus cohabitating men and women. According to Ginn and Arber (1999) little difference exists between single men and married men. For women important differences between the married and the non-married were found. Married women showed to be less well, off with only a minority receiving individual occupational or private pension benefits, though it is expected that these women benefit from the occupational pension rights built up by their spouses. Single women who never were married, in contrast, showed the highest prevalence in occupational and personal pensions. Divorced women are in the least favourable situation with only a minority having a private pension; this group faces the highest risk on deprivation associated with marital dissolution (e.g. Disney & Johnson, 2001; Ginn & Arber, 2001; Price & Ginn, 2003; Shuey & O'Rand, 2006).

Also for financial assets and homeownership, marital status and household composition is found to be important (e.g. Browning & Lusardi, 1996; Wakita, Fitzsimmons, & Liao, 2000). The existence of economies of scale and financial solidarity between partners in couples makes that a part of the mutual income can be saved, while this is not or only partly possible for singles. Also the pooling of financial risks and the sharing of finances within couples contributes to this. Living together with a partner also has a positive effect on the purchase of property, not only because couples overall have more opportunities for wealth accumulation, but also because couples are more inclined to settling down than singles, and thus are more open to home ownership (Hood, 1999).

3.5 Health and functional status

A last determinant that could influence the generosity of the old age income package refers to the individual's health and functional status. In particular, the granting of certain benefits depends on the health and functional status of the person. For example, to be eligible to the majority of the care related benefits the functional status of the person is assessed (cf. supra). Disability benefits (e.g. the benefit for assistance to elderly) are

preserved for elderly facing a severe reduction in their autonomy and problems with activities of daily living. Further, to receive a benefit from the Flemish care insurance, one has to proof a certain degree of care dependency (cf. section 2.6.1).

4. Conclusion

In this chapter we focused on the wide range of sources that are available to the Belgian elderly population to protect themselves against the risks related to the financial dimension of old age dependency. In line with the theoretical frame, these sources are the 'rewards' based on the 'claims' that are made by the elderly population in the three institutional spheres (cf. chapter 2).

The first group of income sources discussed in this chapter is based on claims that are made in the economic and the political sphere. These claims stem from the former contributions on the labour market in the economic sphere (e.g. occupational pensions) or from notions of solidarity and citizenship in the political sphere (e.g. public pensions). Quite often, the claims are based on the interplay between the economic and the political sphere. For example, public pensions are based on one's former activities on the labour market in the economic sphere (and co-financed by the employer), and these actions open the right to make a claim for a pension in the political sphere, based on notions of solidarity and social insurance. Within the public pension protection scheme, a difference was made between public retirement and public survivor pensions. Attention was also paid to the public minimum income protection schemes via the provision of a minimum retirement pension and the Income Guarantee for the Elderly population.

Within the occupational pension schemes, occupational pension plans for employees (sector pension plans and business pension plans) and for the self-employed (voluntary additional pension for the self-employed) were distinguished. Individual pension savings accounts and individual life insurances were found to be the two main fiscally stimulated private pension protection schemes. Both the occupational pension plans and the private pension plans are mainly situated in the economic sphere, but under impetus of the political sphere. After all, we found that the government plays an important role in stimulating the organisation of these types of pension plans via, for example, tax exemptions.

In addition, we also distinguished a number of sources that are limited to the economic, resp. the political sphere. In the economic sphere, we find the 'claims' based on the provision of investment capitals. These claims include financial assets without tax exemptions (i.e. savings account, stocks and bonds, etc.) and the direct revenues from these assets. In the political sphere, we found a number of conditional public cash transfers, namely care related benefits (i.e. disability benefits, long-term care benefits and informal home care benefits), housing benefits (rental subsidies etc.) and the heating

allowance. These 'rewards' are based on notions of citizenship within the framework of the contemporary welfare state.

Lastly, we discussed the potential importance of property assets as a source of income for the elderly population. From the packaging approach, the return from property assets can be situated in the economic sphere: the rent one receives is based on the claim of providing a place to live for another household. However, to a certain extent also the government is involved in property ownership. Via tax exemptions and fiscal measures (based on notions of citizenship) the government can stimulate households to obtain property.

It proved to be difficult to sketch an accurate picture of the importance of these income sources. Occupational pensions for employees are covered quite accurately in the administrative data of the Crossroads Bank for Social Security, but this is not the case for the occupational pension protection enjoyed by the self-employed population. Further, also for private pensions no accurate statistics were found to exist. Moreover, little information is available on the combination of these income sources, nor on their potential to protect the former living standard of the elderly population during their retirement. Also the potential contribution from financial assets and property assets to the old age income package has not been investigated to its complete extent. In debates on the living standard protection of the elderly population, and within the light of discussions on the financeability of public old age income protection, the potential of private income sources to protect the elderly population against the financial dimension of old age dependency needs to be investigated more profoundly. This is one of the main tasks of this dissertation: to investigate in detail the income packaging of the elderly population by taking account of all potential income sources. We do not limit ourselves to sources with personal ownership or to sources that are shared within households, but we combine both into comprehensive income packages. In addition, we will investigate the interplay between personal income sources and asset sources to figure out whether similar patterns of inequality among the elderly are found (for example to what extent are elderly with only limited personal income sources disadvantaged in their asset ownership).

In the second part of this chapter, an overview of the recent research on the income protection of the elderly population was provided. Specific attention was paid to the main stratification determinants explaining the income differences and inequalities within the elderly population. First, gender is put to the forefront in explaining income differences among the elderly population, mainly in explaining the disadvantaged income situation of women. These differences were found to exist with regard to all the income sources discussed. Yet, the question can be posed whether these differences are stronger with regard to specific income sources, and whether taking account of a broader income package (i.e. including financial and property assets) manages to reduce (or increase) the existing income differences between older men and women. Second, the role of labour market history was underlined in explaining both the access to certain income sources, and the level of income protection provided by these sources. This was connected to three basic theories on the role of status and status maintenance in the life course. Researchers

seem to agree on the ongoing influence of one's status during the life course, though differences exist with regard to the scale of this effect. Whereas extensive research exists on the relationship between labour market history and public and occupational retirement pensions, less research was found on the link with other private old age income sources. However, it cannot be questioned that one's labour market situation is decisive in the accumulation of financial and property assets during his or her active life phase, and thus also keeps on exerting its influence during one's retirement. Third, research on the link between one's level of education, as a proxy for socioeconomic status, and the old age income package was summed up. Higher levels of education were found to be associated with more generous old age income sources, and with a wider access to different income sources. Yet and again little to no research was found on the relationship between the level of education and the combination of different income sources into income packages. Questions on whether or not high educated elderly have more diverse income packages than low educated elderly could not be answered from the literature. A last determinant included in the literature review was marital status: being married, living single, being divorced or widowed were found to have important consequences for one's protection against the financial dimension of old age. However, also here, a stronger focus on the overall income package is missing.

To summarise, old age income protection has already been extensively investigated. Yet, a holistic perspective on the combination of different, both public and private, income sources into income packages providing protection against the financial dimension of old age tends to be missing. The existing research focuses strongly on the income protection provided by single sources, without investigating how the combination of different income sources can contribute to the overall level of income protection of the elderly population. This lack makes us critical against the current information on old age income protection.

Further, from social policy perspective, it is interesting to shed more light on the potential contribution of the extended income package to the income protection of specific, currently considered as vulnerable, groups like older (single) women. This is why in chapter 8, the combination of the different income sources by different groups of elderly will be discussed. Extensive attention will be paid on the explanatory power of the mainstream stratification determinants like sex, status and living situation. In addition, including the potential contribution of financial and property assets into the old age income package could be food of thought for policy makers confronted with increasing costs of public pension schemes and looking for alternative income sources.

In the next chapter, we will focus on that other important group of protection mechanisms available to the elderly population, namely all mechanisms focused on providing protection against the functional dimension of old age, thus everything that involves (long-term) care. Attention will be paid to health care services and long-term care services within the Belgian context. Specific attention will be paid to research on the link between income and care, as well as on research explaining differences in the use of health and long-term care services from the main stratification determinants like sex, status and living situation.

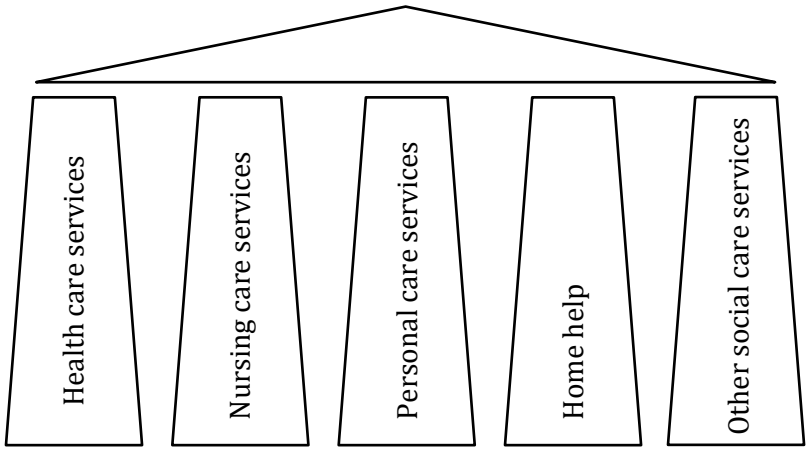
CHAPTER 4

THEORETICAL INSIGHTS IN THE OLD AGE CARE PACKAGE

CHAPTER 4. THEORETICAL INSIGHTS IN THE OLD AGE CARE PACKAGE

In the first chapter of this dissertation, attention was paid to the financial and functional dimensions of old age dependency. It was shown that the health status and the functional level of the population tends to decrease with age. To put it differently, when growing older, the population is confronted more and more with health and functional problems, thus inducing the need for some kind of protection against this dimension of age related dependency. In the subsequent chapter, insights are provided in the mechanisms available to manage this increase in functional dependency, namely the use of health and social care services. These services are combined into care packages, depending on the individuals' preferences, his/her degree of care dependency, the availability of care, etc. (see Figure 4.1).

Figure 4.1. Composition of the old age care package



In the following sections, the possible configuration of these care packages within the Belgian context and the main stratification determinants influencing the use of care services are discussed.

It is important to note that a number of care related mechanisms find themselves on the borderline between in cash and in kind provided protection. An example of this is the provision of health care. In Belgium, health care is provided by both public and private actors, and for both individual users receive reimbursements via the public health insurance scheme. Given the thin demarcation line between both, also the system of public health insurance is discussed briefly in the following sections.

1. General insights

Whereas the income package focuses on income, the care package refers to the wide range of care services available to the population, installed to meet a person's needs so that he or she can live a comfortable and dignified life (Organisation for Economic Cooperation and Development, 2005). These services have to contribute to the quality of life, the mental and physical health of the individual, the potential to live independently, etc. The combination of these services is denoted as the care package. According to the definition of Van Vliet, Broese Van Groenou, and Deeg (2010, p. 3) care packages refer to "useful combinations of care of elderly people living at home", including all types of services available.

On the one hand, the care package includes a wide range of health care services, like consultations with doctors (both general practitioners and specialists), inpatient treatments in hospitals for operations, rehabilitation, treatment of illness, other treatments of injury, sickness or other physical complaints, as well as outpatient hospital treatment. Common is that they are provided by health care professionals (e.g. a general practitioner, a specialised nurse), either inside or outside the home of the care receiver. On the other hand, social care services are included, being all services associated with help with basic activities of daily living and instrumental activities of daily living (resp. ADL and IADL). Help with ADL refers to personal care like bathing, dressing, eating, etc.; help with IADL refers to home help like gardening, shopping, cooking, etc. (European Commission Directorate for Employment, Social Affairs and Equal Opportunities, 2008; Organisation for Economic Cooperation and Development, 2005). Social care services can be provided in different settings:

- at the house of the care receiver (home care: e.g. help with ADL and IADL);
- in transmural or semi-institutional care settings (e.g. day or night care centres, where no permanent stay in the care facility is required); or
- in residential care facilities (i.e. elderly homes and nursing homes), which provide a combination of medical, nursing and long-term care.

Social care services can be provided for short or for extended periods of time. For example, elderly who have left the hospital often need some assistance with ADL and IADL during a shorter period of time. However, elderly with severe and ongoing care dependency will draw on social care services for an extended period of time. In the literature, this is denoted sometimes with the concept of 'long-term care'.

Whereas health care services are always provided by professional care givers, this is not always the case for social care services, specifically when these services are provided at the home of the care receiver. In this case, also informal actors can play an important role in the care giving process (European Commission Directorate for Employment, Social Affairs and Equal Opportunities, 2008; Organisation for Economic Cooperation and Development, 2005; Pacolet et al., 2004, 2000).

One cannot consider the use of care without paying attention to the organisation of these care services by the government. After all, to an important extent the availability of care

services depends on the public efforts to invest and organise these social services. With regard to this, some important research has been done by, among others, Bettio & Plantenga (2004); Bettio, Simonazzi, and Villa (2006); Reimat (2009); and Rostgaard (2002). As was the case with the income package, a link can be made with Esping Andersen's (1990) welfare regime typology. The following care configurations or care regimes are associated with each welfare regime (see Table 4.1).

Table 4.1. Components of the care package and the welfare state configuration

Welfare state configuration	Public versus private care components
Liberal (e.g. UK)	• Major role for private (for-profit) sector actors for organisation of care services • Financing via private health or long-term/social care insurance • Public assistance (services and financial compensation for care) only for most destitute groups of population
Conservative (e.g. Germany, Belgium)	• Important care responsibility for the family • Organisation of social care often by voluntary, non-profit actors • Financing via contributory social insurance system (includes health care and certain types of social care)
Social-democratic (e.g. Sweden, Denmark)	• Major role of public actors for organisation of care • Major role for government for financing of health and social care • Universalistic access to health and social care services • Minor role to informal care ("defamilialisation of care")
Mediterranean countries (e.g. Italy, Greece)	• Major role for the family • Strong values about the importance of family solidarity • Minor role of public care provision

Source: Anttonen & Sipilä (1996); Bettio & Plantenga (2004); Reimat (2009); Rostgaard (2003)

In liberal welfare states, like the UK, the main focus of the organisation of health and social care for the elderly population is on private sector providers. For the financing, individuals are expected to take out a private health and social care insurance, and almost no public compensation for these services is provided. Only the most destitute parts of the population can rely on public services or public finances (to pay for private services). In the corporatist, social-insurance based welfare regimes (e.g. Germany, Belgium), a distinction is made between health care and social care. Overall, health care is offered by public actors, and financed via the contributory social insurance system. The responsibility for social (elderly) care to an important extent comes down to the family. In some of the corporatist welfare regimes, for example Austria and Germany, financial compensations are provided to stimulate informal family care. In the care regime typology of Bettio and Plantenga (2004) these countries are joined in the publicly facilitated, private care model. Despite the strong focus on informal care, also contributory social insurance-like systems can be organised for the financing of social care. In the social-democratic welfare regimes, universalistic, citizenship-based programs of social care and health care protection are organised and financed by the government. This public provision of care substitutes importantly for family care and thus leads to a "defamilialisation" of social care (Reimat, 2009, p. 4). Lastly, the Mediterranean countries

(e.g. Italy, Greece) are considered as a distinct group because of their strong focus on the family. In these countries, strong values about family solidarity exist and this is reflected in the organisation of care. The government hardly provides or finances care services, this responsibility is left entirely to the family.

From the packaging perspective, care is largely the result of claims that are made in the political sphere. Notions of citizenship and solidarity open the right to enjoy protection from public health insurance schemes, the receipt of health and social care services, etc. Overall, safeguarding the health of the population is considered as one of the main tasks of the contemporary welfare state, which makes the provision of health and long-term care a government affair. However, also within the economic sphere the provision of health and long-term care can be claimed from a productivity perspective. Additional employer-provided health insurance schemes, for example, are reserved for employees and are based on the productivity of those employees. This is discussed more in detail in section 2.1.3 of this chapter.

2. Exploring the care package composition within the Belgian context

The care package overall consists of the following elements: health care services on the one hand, and a wide range of social care services on the other hand. In the following paragraphs, detailed information is provided on the outlook of these services within the Belgian context, with specific attention for the services focused on the elderly population. Note that the overview is limited to services focused on functional care limitations; mental health care services are not explicitly included.

2.1 Health care services

The provision of health care services in Belgium is not restricted to the elderly population. But, given the link between age and health discussed in the first chapter of this dissertation, this type of services is very important for the research population. In assessing the outlook of the Belgian health care system, a difference is made between the delivery of health care services as such (2.1.1) and the provision of financial compensations for the use of these services via either public (2.1.2) or private insurers (2.1.3).

2.1.1 Delivery of health care services

The delivery of health care services includes the wide range of medical and paramedical services contributing to the health status of the population. For example, contacts with general practitioners as well as specialists are included, but also the consumption of medication, and hospital treatments (operations, technical examinations, etc.) are involved.

In Belgium, the provision of these services is mainly organised via private health care providers, though to a certain extent, hospitals services are organised via publically owned hospitals (Paris, Devaux, & Wei, 2010). Patients are free in the choice of their health care provider. However, financial incentives have been included in the national health insurance scheme to encourage individuals to get committed to a particular primary care provider via the global medical record [Globaal Medisch Dossier] (Paris et al., 2010). Consultations with the general practitioner holding the patients' global medical record are cheaper and require lower personal payments. For patients older than 75 years, this cost reduction amounts to 30 percent for consultations at the general practitioner's cabinet.[27]

A number of health care services proof to be specifically important for the elderly population. For example, given their reduced mobility and reduced opportunities to go to the GP's cabinet, general practitioner's house visits are very important for the elderly population (Pacolet et al., 2004). Further, since the health status of the older population often is characterised by a combination of different (chronic) conditions (the so-called geriatric medical profile, e.g. multi-pathology, disability, general decline in health status, frailty, etc.), specialised multidisciplinary care is provided via the so-called G-departments in hospitals (geriatric wards). In addition, an important group of elderly is treated in SP-departments focused on specific medical conditions (e.g. cardiologic problems, chronic disorder, functional disorders, etc.). Lastly, elderly are also overrepresented in palliative hospital wards, providing adapted care to terminal patients (Afschrift et al., 2002, pp. 49-59; Cohen et al., 2008).

2.1.2 National health insurance scheme

In Belgium, financial compensations for the use of health care services are provided via the national health insurance scheme.[28] Individuals are obliged to participate in the national health insurance, resulting in a quasi-universal coverage of the scheme (Paris et

[27] Based on the rates of conventional doctor visits as published on the website of the Social Security Agency for Health and Invalidity Insurance [Hulpkas voor Ziekte- en Invaliditeitsverzekering] (http://www.hziv.be/tarieven-artsen-N.htm#huisbezoek75plus).

[28] By extension, reimbursements are also provided for the use of a number of social care services, like personal care at home provided by qualified nurses or the care received in residential and semi-residential care facilities.

al., 2010). To receive reimbursements, one has to join a health insurance fund or a Social Security Agency (S. Callens & Peers, 2003).

A wide range of both preventive and curative (para-)medical services is covered by the national health insurance scheme (FOD Sociale Zekerheid, 2011):

- regular medical care (e.g. consultations with GP or specialist);
- nursing care at home[29];
- dental care;
- pharmaceutical products;
- hospital care (including specialised care provided in residential care facilities for the elderly[30] and elderly day care centres); and
- rehabilitation care.

An extensive list of all health care services suitable for reimbursements via the national health insurance scheme, the so-called nomenclature of medical treatments [nomenclatuur van geneeskundige verstrekkingen], is made up by the National Institute for Health and Disability Insurance (NIHDI) [Rijksdienst voor Ziekte- en Invaliditeitsverzekering]. Different categories of health care and related services are discerned, for example based on the health care provider (e.g. GP versus specialist), the type of services (e.g. dental care, medication, dentures), the diagnose and the care setting (e.g. hospital, nursing home) (Rijksdienst voor Ziekte- en Invaliditeitsverzekering, 2014b).[31]

Several mechanisms are included in the national health insurance for the reimbursement of the use of medical services:

- personal payments with reimbursements,
- maximum billing, and

[29] Nursing care refers to specialised medical care (i.e. administering medication and injections, wound care, pain relief, etc.) provided by qualified nurses in the home of the elderly. These nurses can be either self-employed or employed in a home nursing agency, but always have to be recognised by the NIHDI for the execution of medical tasks. Whether or not one is eligible for home nursing care depends on his/her degree of care dependency. The provision of these services is most often related to additional services and benefits offered by the health insurance funds (cf. supra). Figures on the number of nurses providing nursing care at home are rare. According to statistics of the FACH (Vlaams Agentschap voor Zorg en Gezondheid, 2012c), in 2012 198 teams of home nursing care were active in Flanders. Further, based on financial expenses and user statistics, it is found that nursing care use is slightly more important in Flanders than in Wallonia, and it is found to be least important in the Brussels Capital Region (Pacolet et al., 2004; Pacolet, Merckx, & Peetermans, 2007). Based on statistics of the Belgian HIS (Demarest et al., 2010), in 2008 13% of the population aged 65 years and older received professional nursing care at home.

[30] A financial compensation is provided to elderly permanently residing in a residential care facility. This compensation is paid directly to the institution to compensate for nursing and personal care, and depends, among others, on the degree of dependency of the individual.

[31] The nomenclature of medical treatments was initially published in the Bulletin of Acts, as an annex to the Royal Decree of 14 September 1984 on the nomenclature of medical treatments concerning the compulsory health and invalidity insurance (B.A. 29.09.1984). An online version of the nomenclature can be consulted in the NomenSoft databank of the NIHDI (2014d).

- the third party payer's scheme.

A first mechanism involves personal payments with reimbursements that are provided afterwards. The care receiver pays for the receipt of certain medical services, and afterwards he or she can recover these costs via the national health insurance. Overall, only a part of the total cost is recovered, the non-refundable part[32] is covered by the care receiver. Yet, specific groups of care receivers are entitled to increased reimbursements [Rechthebbende op Verhoogde Verzekeringstegemoetkoming], and are exempted either partially or fully from such co-payments (i.e. lower non-refundable part). This holds for example for low-income widows, orphans, handicapped and low-income pensioners [former WIGW-statute], and - since 2007 - for all other low-income families (Callens & Peers, 2003; Rijksinstituut voor Ziekte- en Invaliditeitsverzekering, 2014c; Van Langendonck, 2001).[33] A second mechanism is the maximum billing system [Maximumfactuur], which has been installed for patients faced with very large co-payments in his or her medical care expenses, due to ongoing and long-term health problems. Whenever the personal co-payments exceed a certain threshold, the remaining medical care costs are entirely compensated by the national health insurance scheme and co-payments are no longer required (FOD Sociale Zekerheid, 2011). The level of this threshold depends on the individual's social category (i.e. those entitled to increased reimbursement; cf. supra) (social maximum billing), or on the household income (income related maximum billing). A third mechanism is the third party payer's scheme [derdebetalersregeling], which implies immediate interventions in the health care costs via the national health insurance. Thus, no or only partial personal payments (i.e. the non-refundable part) are required from the care receiver. The third party payer's scheme is used for specific (costly) health care services. In addition, certain low-income groups can apply for a third party payer's scheme for regular health care services so they only have to

[32] The non-refundable part differs between health care providers, depending on their specialisation, training, time and place of consultations, reputation, etc. So-called fund doctors (i.e. doctors that have subscribed to the general tariff agreements between the health insurance funds and the medical profession) are obliged to charge collectively agreed tariffs (based on the rates included in these agreements). Doctors that have not endorsed to these agreements, are free to decide on the level of the fees they charge. Consultations with non-fund doctors thus can be significantly more expensive than consultations with fund doctors. The reimbursements via the health insurance fund are independent of whether one has consulted a fund doctor or a non-fund doctor.

[33] One should note that access to the more favourable reimbursement rates is granted automatically only to individual receiving social assistance. Other low-income individuals, that are eligible to the higher reimbursement rates, have to submit a request and proof their income situation in order to get access to the more favourable reimbursement scheme. This creates an additional administrative burden that could lead to non-take-up. An small-scale exploratory study of Henin (2013) on the use of health care services by social assistance beneficiaries shows that the favourable reimbursement mechanisms for low-income households are underused. A significant proportion of the low-income individuals does not have a global medical record, and thus misses out on the more favourable reimbursement rates related to this. Also, only a small group of low-income individuals has requested the third party payer's scheme for general doctor visits.

pay the non-refundable part. The health care provider in that case can recover the reimbursable part directly from the health insurance fund.

Besides the costs covered in the regular national health insurance, a number of additional financial compensations for health care costs have been organised by the government. A federal Solidarity Fund [Bijzonder Solidariteitsfonds] has been installed to cover exceptionally large health care costs. Requests for these reimbursements have to be directed to one's health insurance fund. The allocation and the amount granted is decided by a board of specialised doctors (Rijksinstituut voor Ziekte- en Invaliditeitsverzekering, 2006). Further, chronically-ill patients with a high degree of care dependency and high care costs can apply for a flat-rate allowance for chronic disease [Zorgforfait]. The level of this annual benefit depends of the degree of dependency, and on the actual care costs made (Pacolet et al., 2004). For elderly receiving palliative home care, the national health insurance provides a flat-rate palliative allowance [Palliatief forfait]. Also, no co-payments are to be done by palliative patients (Rijksinstituut voor Ziekte- en Invaliditeitsverzekering, 2010).

2.1.3 Private health insurance

In addition to the coverage provided by the national health insurance scheme, in Belgium patients are free to get involved in private health care insurance for additional reimbursements of health care costs. Private health care insurance is provided mainly in two ways (Berghman & Meerbergen, 2005): either via the health insurance fund one is involved in for the national health insurance, and/or via a private (employer-provided) health insurance scheme.

In Belgium, these private health insurance schemes overall cover the costs not included in the national health insurance, and are complementary to the national health insurance (Paris et al., 2010). Obviously, individuals have to pay additional health insurance contributions to the insurer to apply for such private health care insurance.

All health insurance funds, except the Social Security Agency for Health and Invalidity Insurance, offer an additional health insurance to their members, covering a wide range of health care related services and benefits, not or only partially included in the national health insurance scheme (Berghman & Meerbergen, 2005). An important degree of regulation and solidarity is involved, and the services have to contribute to the physical, mental and social well-being of the insured population. This includes, for example, additional reimbursements for health care services, and the organisation of medical and paramedical services. On no account elderly may be excluded from the additional insurance offered by the health insurance fund. However, when based on objective grounds, age-related exclusions from certain reimbursements and services are allowed.

In addition, private insurance companies offer private health insurance schemes. Often, these schemes are organised via the employer as an additional service for their employees.

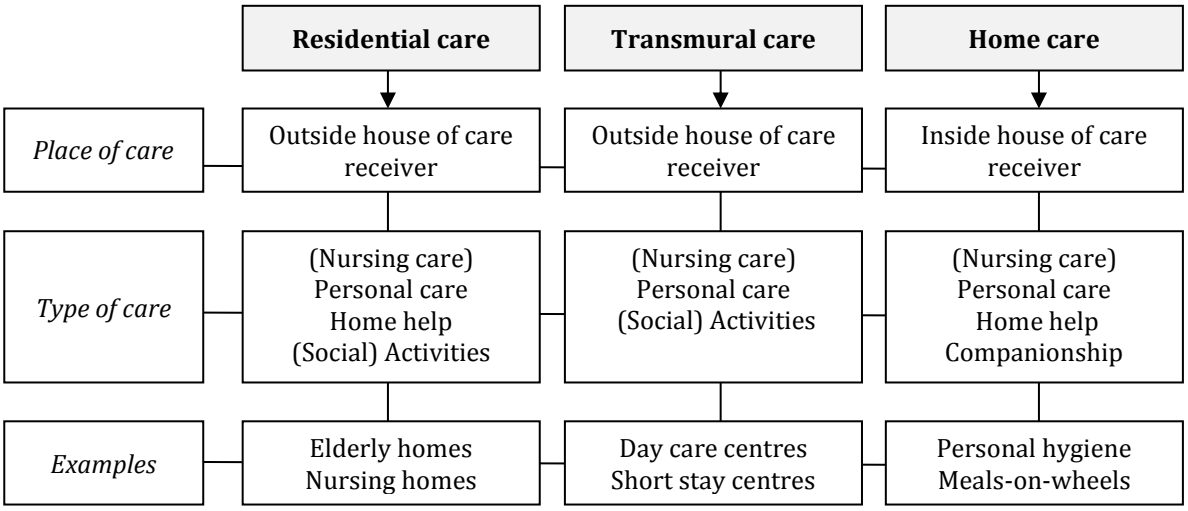
Most often this takes the form of an additional hospitalisation insurance, protecting against the supplemental costs of hospitalisation not covered via the national health insurance (Berghman et al., 2005; Schokkaert, Van Ourti, De Graeve, Lecluyse, & Van de Voorde, 2010). Insurance premiums have to be paid to apply for coverage via a private health care insurance. These premiums can be paid by the insured individual or by his/her employer in case of an employer-provided private health insurance.

Concerning the opportunities for the elderly population to get involved in private health care insurance, the following should be noted. It is prohibited for private health insurance providers to end the insurance contract when the insured individual reaches the age of 65 years (principle of lifelong insurance coverage). Moreover, individuals covered via an employer-provided private health insurance can opt for an individual continuation when the employment contract comes to an end. Further, the health insurance premiums are found to increase with age, mainly because of age-related increases in the prevalence of health conditions and problems.

2.2 Social care services

As was the case with health care services, the provision of social care services in Belgium is not limited to the elderly population. However, given the strong link between functional limitations and age, an important group of elderly population draws on social care service. Different viewpoints can be taken when discussing the availability of social care services, focusing on the actors involved, the place of care provision, etc. In the following sections, the organisation of social care is assessed from the place of care provision, differentiating between intramural or residential care, transmural care and extramural or home care (see Figure 4.2).

Figure 4.2. Overview of the main characteristics of social care services[34]



Only services providing nursing care, personal care and home help (i.e. help with ADL and IADL) are included in the overview (2.2.2). Services focusing on re-activation and social inclusion are left out of the overview. Further, only services actually providing care are included; services responsible for the provision of information, advise and the coordination of health and social care are not discussed. To start off, some insights are provided in the complex sharing of responsibilities for the organisation of care services in Belgium (2.2.1).[35]

2.2.1 Organisation of social and old age care services

In Belgium, the policy responsibilities for the organisation of old age care services are shared between federal and regional policy makers.[36] The contours of elderly care policy are set out in a more or less harmonised and coordinated way via a number of protocol agreements focusing on common objectives and the contours of the programming of facilities.[37] These agreements are the result of the interministerial conference on public

[34] Note that nursing care is included in this overview of social care services (between parentheses), because in Belgium certain personal care services can be provided by specialized nurses and are included in the national health insurance scheme (cf. section 2.1).
[35] Our overview dates from before the transfer of social care responsibilities from the federal to the regional policy level at the end of 2014.
[36] This division of responsibilities is based on the 1980 law on the reformation of the Belgian institutions (art. 5 §1; B.A. 15.08.1980) and laid down in the Belgian Constitution (art. 128,130,135).
[37] The last protocol agreement dates back to 2005 (Protocol agreement n°3 of 13 June 2005, B.A. 28.04.2006), earlier agreements were made in 2003 (Protocol agreement n°2 of 1 January 2003, B.A. 30.11.2004) and 1997 (Protocol agreement n°1 of 9 June 1997, B.A. 30.07.1997).

health and the intergovernmental working group on elderly care policy joining federal, regional and communal policy makers involved in elderly care issues, the NIHDI and the Belgian Health Care Knowledge Centre [Federaal Kenniscentrum voor de Gezondheidszorg]. A common concern expressed in these protocol agreements refers to ageing at home, and the aim to stay at home as long as possible via, among others, the development and expansion of home care services. Further, the guidelines and scale of this expansion are laid down in the protocol agreements, as well as the number of care units and the criteria for the development of additional residential long-term care facilities.

Further, a quite complex division of responsibilities exists between the federal and the regional level with regard to the organisation of care services, and these differences are related to the place of the care provision (see Table 4.2).

Table 4.2. Division of responsibilities on care services among federal and regional policy makers

Type LTC	Federal level	Regional level
Intramural & Transmural	• Recognition and planning • Price setting of accommodation • Financing (e.g. management, staff, nursing equipment) • Reimbursements via the national health insurance	• Planning, supervision and recognition • Subsidies for e.g. infrastructure, animation, activation
Extramural	• Reimbursements via the national health insurance	• Planning, supervision and recognition

Concerning the care services provided in an intramural or a transmural care setting, responsibilities are divided between the federal and the regional policy level (FOD Economie, K.M.O., Middenstand, en Energie, 2009). At the federal level, different departments are involved in different aspects of the care provision[38]:

- the FPS Health decides on the recognition standards for nursing homes providing long-term care to elderly with a severe degree of care dependency;
- the outline of the planning of the number of nursing homes is decide by the FPS Social Security;
- the Price Service of the FPS Economy is responsible for the maximum price policy and keeps an eye on price changes of residential care accommodation; and
- the NIHDI stands in for the financing of residential care facilities and for the reimbursements made to care receivers via the national health insurance.

The actual planning of the number of places in care facilities that is needed in the future, the supervision on the minimum quality levels and the recognition of nursing homes and

[38] Note that at the end of 2014 important shifts have occurred in the long-term care policy responsibilities. All responsibilities related to residential long-term care have been transposed to the Belgian regions.

residential care facilities is a regional responsibility. Consequently, regional authorities are obliged to make up their own rules and standards for this. In Flanders, this responsibility is granted to the Flemish Agency for Care and Health (FACH) [Vlaams Agentschap voor Zorg en Gezondheid]. In Wallonia, this is a responsibility of the General Operational Board of social action and health [Pouvoirs locaux, action sociale et santé – direction aînés], and in the Brussels Capital Region, decisions on residential care are taken collectively by the administration of the French Community Commission, the Communal Community Commission and the Flemish Agency for Care and Health. Further, regional authorities can grant subsidies for the financing of, among others, infrastructure, animation and activation of the elderly residents in (semi-)residential care facilities (FOD Economie, K.M.O., Middenstand, en Energie, 2009).

The policy responsibilities for care services provided at home, on the other hand, come entirely to the regions. Only the reimbursements made for the receipt of personal care services via the national health insurance scheme are a federal responsibility. Regional authorities decide almost completely autonomous on the goals and orientations of their (long-term) care policy, the planning, recognition and supervision of the different facilities. However, the contours of these decisions are commonly laid down for all Belgian regions in the Protocol Agreements (cf. supra).

2.2.2 Delivery of old age care services

As illustrated in Figure 4.2, the provision of old age care services involves a wide range of services, delivered either inside or outside the home of the care receiver. These services can be provided by public or private actors. As was the case with health care services, the care receiver is free in his/her choice of the care provider, though often this choice stems from the services offered via the additional health insurance of the care receiver's health insurance fund (cf. supra).

Residential care facilities

Residential care facilities include homes for the elderly and nursing homes permanently residing elderly persons with a certain degree of care dependency. These residential, intramural care facilities combine several functions: residence, activities of daily living, personal care, nursing care, and to some extent also (non-specialised) medical care. The care provided in these facilities always is provided over an extended period of time (long-term care). According to an overview of the Belgian long-term care system by Willemé (2010), residential care facilities are provided by local Public Centres for Social Welfare (PCSW) [Openbare Centra voor Maatschappelijk Welzijn, OCMW's], or by private for-profit and not-for-profit institutions.

In Belgium, residential care facilities are reserved for the population aged 60 years and over. Homes for the elderly focus on the provision of residence and assistance with activities of daily living for mainly elderly with a low level of care dependency, while nursing homes also provide nursing care and focus on elderly with a severe degree of care dependency (i.e. grades B and C of care dependency[39]). However, in reality, residential care facilities often combine both, and provide residence and assistance with activities of daily living as well as nursing care to elderly with a severe degree of care dependency. For example, according to data of the NIHDI (2012), in December 2011 about three quarters of all residential care facilities were combinations of elderly homes and nursing homes.

Based on statistics of the NIHDI (2012), in September 2012 there were 1554 residential care facilities for the elderly population, providing accommodation to by and large 132000 elderly in need of permanent care (see Table 4.3). About halve of all these facilities is situated in Flanders, accounting for 52% of the residential long-term care beds. In Wallonia, 616 nursing homes and old age homes are found, providing accommodation to about 46000 elderly.

Table 4.3. Residential long-term care in Belgium (resp. number of nursing homes and elderly homes and beds), by region (2012)

	Facilities		Beds	
	N	%	N	%
Region				
Flanders	761	49.0	69120	52
Walloon region	616	39.6	46895	35
Brussels Capital Region	169	10.9	15708	12
German Community	8	0.5	728	1
Total	**1554**	**100**	**132451**	**100**

Source: Author's calculations based on NIHDI (2012)

Besides homes for the elderly and nursing homes, special residential care facilities exist for elderly with a minor to moderate degree of dependency: assisted living facilities or service flats. Strictly spoken, service flats are not considered as permanent care facilities, since no permanent, continuous care is provided. Only a central permanence centre has to be installed, in that the residents can call for help in case of emergency. Residents are expected to have a low degree of care dependency (ideally a degree of O or A on the KATZ-scale) and to be able to live almost entirely independent. However, care services are organised in the close environment of the residence, so that residents can use them on a voluntary, non-permanent basis (e.g. delivery of meals, cleaning services and limited

[39] The grades of care dependency are based on the activities of daily living included in the KATZ-scale: O=no care dependency, A=minor degree of care dependency, B and C=severe degree of care dependency (Art. 150 of the Royal Decree of 3 July 1996 for the execution of the law on the mandatory insurance for health care and benefits coordinated on 14 July 1994, B.A. 31.07.1996).

nursing care). Further, in a number residences common activities are organised, thus contributing to the social network of the residents (Vanden Boer, 1999).

The organisation of these assisted living facilities often comes down to private (for-profit and not-for-profit) providers, though public providers are not explicitly excluded. An estimation of the number of service flats in Belgium showed that in 2011 about 600 service flat buildings put nearly 18000 accommodations[40] at the disposal of the (semi-)valid elderly in search of (semi-)assisted living (Table 4.4). Note the large discrepancies between the Belgian regions: The bulk of the service flats is situated in Flanders (81% of all facilities), while only 15% of the service flat residencies is situated in the Walloon region and about 4% is found in the Brussels Capital Region.

Table 4.4. Estimation of the availability of service flats in Belgium (resp. number of facilities and accommodations), by region (2011)

	Facilities		Accommodations	
	N	**%**	**N**	**%**
Region				
Flanders	472	81	14846	82.9
Walloon region	88	15	1682	9.4
Brussels Capital Region	23	4	1368	7.6
German Community	3	1	16	0.1
Total	**586**	**100**	**17912**	**100**

Source: Author's calculations based on mix of sources[41]

In addition, also other alternative housing facilities for the elderly population are developed, like shared housing ("kangaroo housing"), sheltered accommodation and duplex apartments. However, these rest entirely on private initiative, and no information is available on their popularity and on their distribution across Belgium.

Transmural care facilities

Transmural or semi-residential care facilities focus on the provision of social care services outside the house of the care receiver, though not on a permanent residential basis. The services not necessarily are provided for an extended period of time, and thus not always

[40] Note that each accommodation can house one or two persons. No information is available on the number of persons per accommodation.

[41] These statistics are an estimation of the actual situation, based on information from the Flemish Agency for Health and Care (Vlaams Agentschap voor Zorg en Gezondheid, 2011c) for Flanders; the Walloon Public Service Administration for the Elderly (Direction générale opérationnelle des Pouvoirs locaux, de l'Action sociale et la Santé, 2011) for Wallonia; the database of Home-Info vzw (2011) for the Brussels Capital Region; and the databases of Senior Info (2011) and SeniorenNet (2011).

are considered as long-term care services in the strict sense. Transmural care services includes, among others, the social care provided in day care centres, night care centres, short stays at residential care facilities, short stay centres, etc. (Pacolet et al., 2004; Willemé, 2010). Both public (local PCSW's) and private actors (for-profit and not-for-profit) are responsible for the organisation of these facilities.

Nursing care as well as personal care (help with ADL and IADL) are provided. It is focused on elderly with a moderate degree of care dependency, still able to live at home. Transmural care serves three main goals: (1) to maintain to stay at home as long as possible; (2) to provide additional care to elderly living at home when no or only limited informal care is available; and (3) to alleviate the burden of the informal care giver(s) (Willemé, 2010).

In Belgium, only two types of transmural care are explicitly authorised by the government: short stay centres and day care centres. On the one hand, elderly in need of alternative care for a short period of time can be looked after in short stay centres [centra voor kortverblijf], providing temporary day and night care, with a maximum of 90 days per year, similar to the care provided in residential care facilities. Most often this type of care is provided in a residential care facility. Day care centres [dagverzorgingscentra], on the other hand, provide different types of care (i.e. personal care, nursing care, meals, and social activities) during the daytime to elderly with a moderate degree of dependency.

The development of these transmural care facilities is found to be importantly more modest in comparison with the residential care facilities. In 2011, 479 short stay centres and 194 day care centres could provide care to 4765 elderly in need of temporary residential care. About 65% of these facilities is located in Flanders and 30% is located in Wallonia (Table 4.5).

Table 4.5. Short stay and day care centres in Belgium (number of facilities and number of places), by region (2011)

	Short stay centres				Day care centres			
	Facilities		Beds		Facilities		Beds	
	N	%	N	%	N	%	N	%
Region								
Flanders	306	63.9	1399	62.2	129	66.5	1753	69.7
Wallonia	155	32.4	782	34.8	49	25.3	523	20.8
Brussels Capital Region	14	2.9	55	2.4	12	6.2	210	8.3
German Community	4	0.8	14	0.6	4	2.1	29	1.2
Total	**479**	**100**	**2250**	**100**	**194**	**100**	**2515**	**100**

Source: Author's calculations based on mix of sources[42]

Also other types of transmural care are found, though not authorised by the federal policy makers, nor organised the same in all Belgian regions. This includes, among others, night care, providing care during night-time (night hotel). Again, this care is provided only on a temporary basis to elderly in need of extra care or attention during night-time. This care is provided in a residential care facility or in a short stay centre. In Flanders, until now, no legal framework exists for night care, while both in Brussels and Wallonia night care is included in the regulations on care for the older population.[43] However, little information is available on the actual importance of these services, since the provision of night care is entwined with the care provided in short stay centres and temporary care provided in elderly homes.

Further, in Flanders for short periods of time host families take care of elderly without specialised or intensive care needs, though looking for company, social activation, supervision and (limited) assistance with ADL and IADL. This is organised and coordinated by local services for host families, and depends on the voluntary efforts of the host families (Vlaams Agentschap voor Zorg en Gezondheid, 2012a).[44]

[42] These statistics are based on information from the Flemish Agency for Health and Care (Vlaams Agentschap voor Zorg en Gezondheid, 2011a, 2011b) for Flanders; the Walloon Public Service Administration for the Elderly (Direction générale opérationnelle des Pouvoirs locaux, de l'Action sociale et la Santé, 2011) for Wallonia; the database of Home-Info vzw (2011) for the Brussels Capital Region; and the Infocenter of the German Speaking Community (DG Belgien, 2011a, 2011b).

[43] Some night care initiatives in Flanders and Brussels receive project subsidies from the NIHDI within the framework of the development of alternative care initiatives from dependent elderly (Rijksinstituut voor Ziekte- en Invaliditeitsverzekering, 2014a). Also the Flemish Agency for Care and Health grants subsidies to innovative projects experimenting with night care for dependent elderly (Vlaams Agentschap voor Zorg en Gezondheid, 2014)

[44] Also private initiatives offering this type of care have been developed in Belgium. One important example is Baluchon Alzheimer, a non-profit organization offering continuous care to elderly with Alzheimer's disease for short periods of time. More information on Baluchon Alzheimer can be found on the website: http://www.baluchon-alzheimer.be.

Home care

Home care refers to the wide range of social care services provided at the house of the care receiver. This includes personal care and home help. Also companionship can be part of the social care services provided at home. Home care services can be provided for a short period of time (for example, acute home care after a hospitalisation) or for a longer period of time.

Personal care services (e.g. going to the toilet, getting dressed, etc.) can also be provided by both formal (professional) and informal (non-professional) care givers. Whenever provided by formal care givers, these tasks often come to qualified nurses or (not qualified) professional personal care givers. Home help refers to help with household chores. This includes, among other, the preparation of meals or the at-home delivery of meals (meals-on-wheels), garden work, cleaning, grocery shopping, etc. Often, also the provision of company and supervision for elderly that cannot stay at home alone is included in home help. The non-specialised character of home help makes that it can be provided by both formal and informal care givers. When formally provided, both public and private actors can offer home help.

Figures on the development of personal care and home help services within Belgium are limited and very fragmented. Consequently, it is difficult to sketch a complete picture of the importance of these services. In Flanders, the provision of personal care and home help is coordinated and supervised by the Services for family care and supplementary home care [Diensten voor gezinszorg en aanvullende thuiszorg]. In 2012, 127 services for family care were providing family care to the population (independent of age) (Vlaams Agentschap voor Zorg en Gezondheid, 2012b). Concerning the actual hours of care provided, according to a study of Pacolet et al. (2004, 2007) in Flanders the formally provided home help and personal care outweighs that of Wallonia. Lastly, the Belgian Health Interview Survey (HIS) provides some insights on the use of social care services at home (Demarest et al., 2010). This however does not entirely reflect the actual size of the supply of these care services. In 2008 about a fifth of the population aged 65 years or older used home help services, while about 4% used a meals-on-wheels service for the delivery of meals at home. The incidence of use is found to be significantly higher in Flanders than in Wallonia and Brussels.

2.2.3 Care insurance

The costs of the use of social (long-term) care services can be covered in three ways: either via the national health insurance scheme, via the public social care insurance scheme (in Flanders), or via a private (long-term) care insurance schemes.

Social care services included in the national health insurance scheme

Personal sanitary care, provided by a qualified nurse at the house of the care receiver, is included in the nomenclature of the national health insurance scheme. Reimbursements are thus provided via the national health insurance scheme, though overall also co-payments of the care receiver are required (cf. supra). Low-income elderly are exempt from these co-payments.[45] Further, often also account is given to the care receiver's degree of care dependency. Elderly with a more severe degree of care dependency have to pay smaller personal contributions than elderly with a more modest degree of care dependency.

Further, for the financing of a number of social care services, additional insurance is provided by the health insurance agency, to which one has to register to apply for the national health insurance. The services covered differ between the health insurance funds, but often include compensations for personal care and home help, coordination of the care package, etc.[46]

Public social care insurance scheme

In Belgium, no national public social care insurance scheme has been set up, mainly because social care is a regional, and not a federal, responsibility. However, in Flanders a social care insurance scheme [Vlaamse zorgverzekering] was introduced in 2001 providing additional financial protection for the use of non-medical, social care services (e.g. home care, personal care) by individuals with a severe degree of care dependency (cf. chapter 3). These services can be provided either in a residential care facility or in the house of the care receiver, by a professional formal or non-professional, informal caregiver. Only those with a severe degree of care dependency can apply for compensations in the social care insurance scheme. The financial compensations are flat-rate and do not take account of the care receiver's own income sources.

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[45] These co-payments can be quite important. For example, a survey of the FPS Economy (FOD Economie, K.M.O., Middenstand, en Energie, 2009) showed that the personal contribution of the care receiver in a residential care facility ranges between 31 and 46 Euros per day (961 to 1426 Euros per month). These individual contributions have to cover the costs for the residence (the so-called hotel costs), and the use of supplementary services (like hairdresser, laundry service, pedicure, etc.). Under specific conditions, low-income elderly staying in a residential care facility can apply for financial PSWC support to finance their stay in the residential care facility. Further, this group of elderly can also apply for a PSWC allowance for elderly residents [zakgeld voor rusthuisbewoners]: a flat-rate monthly allowance to spend on additional personal expenses.

[46] Note that the use of certain home help services (e.g. cleaning, laundry, grocery shopping) is covered via the system of service checks [dienstencheques]: the care receiver pays a fixed hourly compensation, independent of his/her income, of which a part can be claimed back via the annual tax declaration.

Private long-term or social care insurance schemes

Individuals are free to participate in a private long-term or social care dependency insurance scheme offered by a private insurance company. Financial compensations are provided in case of "a medical physical or mental incapacity to perform certain activities of daily living" (Berghman et al., 2005, p. 44). Although little is known about the popularity of these private care insurance schemes, we do know that in Belgium only a very limited proportion of the population takes part in this type of insurance (Berghman et al., 2005; Colombo, Llena-Nozal, Mercier, & Tjadens, 2011).

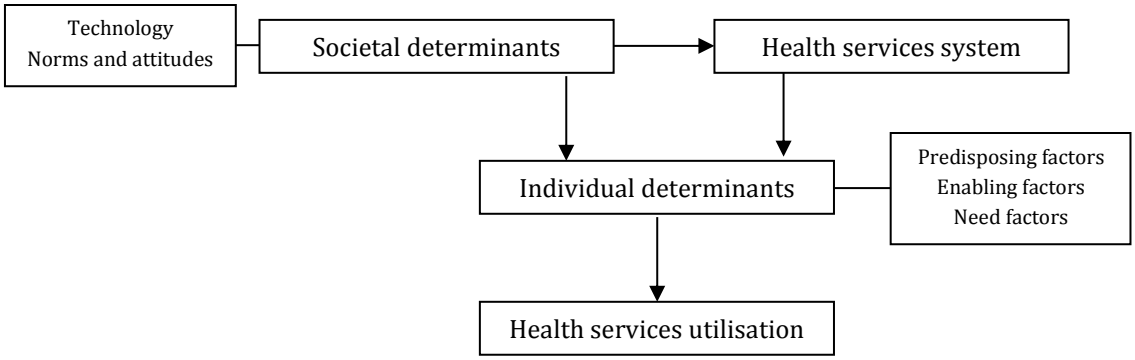
3. Determinants of the care package

In this section, an overview of the literature on the determinants of the care package composition is provided. For this, we draw on the classic behavioural model of health services utilisation developed by Andersen at the end of the 1960s (Andersen, 1968; Andersen & Newman, 1973). The framework is widely recognised as 'the' tool to analyse the use of health care services, and has been the object of critics, revisions and refinements from its development onwards (Andersen, 1995; e.g. Andersen & Davidson, 2001). Without going into the details, the main points of the framework are presented here. Afterwards, attention is paid to the relationship between income and care utilisation. Lastly, a number of other stratification determinants of elderly care use are touched upon.

3.1 The health services utilisation framework

Seminal in the research on health care use is the work of Andersen (1968), who developed a model for explaining and predicting the use of health care (and social care) services. Initially, Andersen (1968) developed his model to explain differences in health utilisation with a focus on the family as the unit of analysis. Later, the focus of the model shifted to the individual, mainly because health status proved to be difficult to measure at family level (Andersen, 1995). The main focus was on individual factors that could both explain and predict health care services use. However, to a limited extent also societal determinants were taken into account (Andersen & Newman, 1973) (see Figure 4.3).

Figure 4.3. Andersen's health services utilisation framework



Source: Andersen & Newman (1973, p. 4)

With regard to the individual determinants, the model focuses on "the individual characteristics of people which help to determine the health care they receive" (Andersen & Newman, 1973, p. 12). These are divided into three groups of factors. First, predisposing factors include the determinants preceding and not directly related to health care use, though posing an indirect influence on it. This includes demographic characteristics like age and gender; social structural characteristics like socioeconomic status, education and occupation; and attitudes and beliefs about medical services. To illustrate, age is not directly related to health care use, though with age the prevalence of health problems increases and thus also health care use related to this. Secondly, enabling factors refer to resources that facilitate the access to health care services, both at household and community level. At household level, for example income and health insurance is found to enable the access to health care services. At community level, the size of health services and whether or not one lives in a rural or an urban environment predicts if the individual has easy access to health care services. Lastly, need factors refer to characteristics directly influencing one's health care use: an individual has to be confronted with illness before turning to certain health care services. This includes both the subjective, self-perceived illness level as well as the evaluated, objective illness level (i.e. medically assessed illness or possibility of its occurrence) (Andersen & Newman, 1973).

At the contextual level, initially societal determinants referred to technology (changes and improvements in medical treatments and procedures), norms (values and opinions towards health care utilisation, either or not formalised via legislation) and the health services system (resources and organisation of the formal health care) (Andersen & Newman, 1973). Later, a more elaborated viewpoint on the contextual determinants was developed, differentiating between contextual predisposing, enabling and need factors, resembling the classification of the individual level determinants (Andersen & Davidson, 2001). The contextual predisposing factors refer to the aggregate, already existing conditions not directly related to health care usage, though significantly influencing it. For example the age structure, ethnic composition and overall educational level of the population are included here. Enabling factors, on their turn, refer to the conditions enabling the access to and the use of health care services. This includes health policies,

financing characteristics (e.g. per capita income, health insurance coverage, per capita health expenditures), and the organisation of health services. This last element refers to the development of health facilities and personnel, and is closely related to what initially was classified as the health care service system determinants. Need factors, at last, refer to the quality of the physical environment (e.g. quality of water) and more general population health indicators.

Given the focus of our research on individual protection against old age dependency, no further attention is paid to the contextual factors influencing (health) care utilisation, however, without neglecting the importance of these factors. In the following sections a selection of stratification determinants, also included in the Andersen model of care utilisation are discussed and substantiated with findings from empirical research. The main focus is on income (enabling factor), since this is central in our research question. Additionally, also other influencing factors are included:

- predisposing factors: gender, age, socioeconomic status and marital status;
- enabling factors: income; and
- need factors: health and social care needs (health status and functional level).

3.2 The role of income in explaining health and social care services use

In the seminal Andersen framework of health care services utilisation (Andersen & Newman, 1973), income is included as an enabling factor, inducing the access to specific health and social care services. Income thus reflects the degree of economic access, referring to "an individual's [...] financial ability to pay for medical care" (Dunlop, Manheim, Song, & Chang, 2002, p. S224). Central in the research on income and care use is the role of the national health and social care insurance schemes, since these schemes can mediate the influence of income on health and social care services utilisation. In the following sections, more detailed insights from empirical research are provided on the role of income in the use of health and social care services, the 'mediating potential' of public insurance schemes, and the potential interactions between the old age income package and the use of health and social care services.

3.2.1 Income and health care services use

National health insurance schemes, providing financial coverage for the use of health care services to (almost) the entire population, have been installed in all Western European countries (Paris et al., 2010). Overall, partial or full coverage of the costs of basic primary health care services, like doctors consultations, medical tests and examinations, and

hospital care[47] is provided (Organisation for Economic Cooperation and Development, 2012). In addition to the national health insurance, voluntary health insurance can be taken out. Coverage via a private voluntary health insurance scheme is classified as complementary, when it covers the non-covered costs of the services in the national health insurance scheme; supplementary, when it covers for services not included in the national health insurance scheme; or duplicate, when the coverage is similar to that of the national health insurance scheme (Kiil, 2012; Paris et al., 2010).

Three reasons, all related to the system characteristics of the national health insurance schemes, are put forward by Devaux and de Looper (2012) to explain income related differences in health care utilisation. The first reason refers to the public health setting and the practical organisation of the health care system. Whether or not the individual has to pay the costs for the use of health services up-front (out-of-pocket payments versus third-party payer's scheme), the administrative burden of the reimbursement procedure, the time span between the out-of-pocket payment and the receipt of the reimbursement and the lack of knowledge about the reimbursement procedure make that low-income households are faced with more difficulties to apply for reimbursements than high-income households. This results in a lower use of health care services by low-income households. The second reason refers to the level of the out-of-pocket payments (co-payments), or, to put differently, the level of the non-refundable contribution of health care services. A larger personal contribution for certain health care services makes them less accessible for low-income households. Thirdly, the importance of private health insurance schemes, beside the national health insurance scheme, could account for income related inequalities in health care utilisation. Private health insurance schemes overall are based on personal insurance fees, that tend to favour high-income groups with more means to buy themselves into a private insurance scheme than low-income groups (Kiil, 2012). In addition, because private insurance fees overall are risk related, and income is strongly associated with health status (Mackenbach et al., 2008), low-income individuals, who tend to have a worse health status than high-income individuals, are faced with higher insurance fees than high-income individuals. In addition, because private health insurance is associated with access to more and higher quality health care services, that are often significantly faster available than public health care services, the relative importance of private health insurance is expected to favour higher-income households even more (Devaux & de Looper, 2012; Jones, Koolman, & van Doorslaer, 2006; Kiil, 2012).

Research confirms the existence of income related differences in health care utilisation within the complete population, as well as within the elderly population, despite the existence of widespread national health insurance systems. Overall, low-income households are found to have less access to health care services and lower degrees of health care utilisation, though their need for health care is expected to be higher because

[47] To a lower extent, also dental care and prescribed pharmaceuticals are covered in the majority of the national health insurance schemes.

of a negative relationship between income and health status (cf. the literature review of Feinstein, 1993). However, the relationship between income and health care use tends to differ when account is given to the type of health care service (Allin, Masseria, & Mossialos, 2009; Van der Heyden, Demarest, Tafforeau, & Van Oyen, 2003; van Doorslaer, Koolman, & Jones, 2004; van Doorslaer & Masseria, 2004). According to a comparative study of Devaux and de Looper (2012) in 19 OECD countries, health care utilisation equity is higher for visits to a general practitioner, while the differences between low and high-income individuals increase when the focus is on specialist and dentist visits, in that the likelihood and the frequency of specialist and dentist visits is higher among high income individuals than among low income individuals.[48] Concerning inpatient hospital treatment, little differences are found between high-income and low-income individuals, when account is given to the differences in their health status (van Doorslaer & Masseria, 2004). Lastly, a similar relationship between health care utilisation and income is found when health care use is measured as foregone health care or unmet health care needs (cf. Allin & Masseria, 2009; Litwin & Sapir, 2009). In Europe, perceived income adequacy, i.e. the subjective estimation of the financial capacities of the household, is found to have a substantive influence on the decision not to draw on a particular health service (Litwin & Sapir, 2009). Similarly, the proportion of those reporting unmet health needs – which refers to problems in the access to health services – is higher among those with lower incomes (Allin & Masseria, 2009).

Whereas the relationship between income and health care access has been fairly extensively documented, this does not hold for the possible role of wealth in health care utilisation.[49] Little research exists on this, though, as discussed earlier, wealth is a particularly important potential source of income for the elderly population (cf. chapter 3). One reason that could account for this is the fact that wealth is not immediately available for consumption goals, and thus cannot be used for the direct financing of health care services utilisation. However, wealth is recognised as a future source to finance health care services, since wealth accumulation for unforeseen circumstances is seen is one of the main motives for saving (i.e. "the precautionary motive": Keynes, 1936 cited in Browning & Lusardi, 1996, p. 1797). Further, asset ownership is associated with altered consumption patterns (Henretta & Campbell, 1978), in that wealth provides a buffer for higher consumption levels. Mortgage-free homeownership, on his turn, contributes importantly to the available income, since no rents nor mortgages have to be paid for

[48] Specialist and dentist visits are thus considered to be strong pro-rich distributed (van Doorslaer & Masseria, 2004).

[49] While little research exists on the relationship between wealth and health care use, literature on the relationship between health status and wealth does exist (e.g. the literature review of Feinstein, 1993). Overall, higher wealth stocks are associated with better health status. However, this literature does not provide insights in whether or not the wealth stock interacts with differences in health care utilisation.

housing. Consequently, a positive relationship between mortgage-free homeownership and the possibility to buy in additional health care services could be expected.

Lastly, also limited research exists on the relationship between the diversification in the income package (i.e. the number and type of different income sources available) and the access to health care services. Yet, it could be expected that, for example, an individual with an employer-provided pension plan also receives additional health insurance provided via the employer. Thus, a positive relationship between employer-provided income protection and health protection could be expected, although this relationship has not yet been investigated. Similarly, it would be interesting to investigate whether individuals taking out a private pension plans are also more likely to opt for a supplementary or a complementary private health insurance plan. No research exists investigating the link between these sources of old age protection.

3.2.2 Income and the use of social care services

Whereas for health care services broad public health care systems have been set up in all Western European countries, this is not the case for social and long-term care services. A strong degree of differentiation and fragmentation among Western European countries is found in their organisation and financing of the social care provision. In the overview provided by Colombo, Llena-Nozal, Mercier and Tjadens (2011) three groups of countries with similar social care systems are discerned:

- countries with a single social care system providing universal coverage;
- countries with a mixed system of social care provision; and
- countries with means-tested safety schemes for social care services.

In the first group of countries (including Belgium) almost the entire population enjoys public social care services, irrespective of their income, assets or personal care resources (like the availability of informal care). A minimum standard of care is included to safeguard the quality of the care provided. In the second group of countries (e.g. France), combinations of social care benefits, programmes and services have been set up, though not joined together into a single care scheme. For example, different systems have been set up for different types of care, combinations of income-tested benefits and universal coverage are found, etc. On average, in these countries a lower coverage of care costs is found and households are confronted with significant amounts of out-of-pocket payments, which is particularly difficult for low-income households. Further, in case of fragmentation in the provision of services, more problems occur in protecting a minimum quality standard, and households have more difficulties is assessing to what services they are eligible (knowledge problems). In the last group of countries, with means-tested care services, only low-income household are eligible to publically provided social care services, leading to an overall low degree of coverage. High income households are expected to draw on private insurance schemes to compensate the costs of social care. Consequently, households with incomes just above the income thresholds in the public

schemes cannot apply for public services, though do not have sufficient means to pay for private services or take out private social or long-term care insurance, and are thus not covered at all.

The lack of public social care (insurance) systems leads to important income-related differences in the access and utilisation of these care services. Overall, more generous income levels are associated with a higher probability of formal care utilisation (Declercq et al., 2009; Geerlings, Pot, Twisk, & Deeg, 2005; Geerts, 2009). Furthermore, Geerlings et al. (2005) found that in the Netherlands having a high income was significant in predicting the transition from no or informal care to privately purchased home care. This is at odds with the general conclusion of Goodridge, Hawranik, Duncan and Turner (2012) on the access and utilisation of home care services. Based on an extensive literature review, they concluded that low-income individuals tend to receive more home care services than high-income individuals, even after controlling for differences in their health and functional status. Similar results were found by Kadushin (2004) and Crets (1992).

As was the case with health care utilisation, little research exists on the role of assets in explaining differences in the use of social care services. In their comparison of four European countries (the Netherlands, Italy, Belgium and the UK), Broese Van Groenou, Glaser, Tomassini and Jacobs (2006) found that in the UK and Italy individuals without homeownership had a higher propensity to receive informal care, mainly because this is much cheaper than formal care. However, in the same study they also found that "those who were not owner occupiers had higher odds of formal help [in the UK and Belgium]" (Broese van Groenou et al., 2006, p. 759), which is at odds with the findings in the UK and Italy.

Moreover, little to no research exists on the link between the composition of the old age income package (i.e. the number and type of income sources available) and the access to social and long-term care services. To put it differently, no answer is provided to the question whether a diversification in one's income sources increase one's access to social care services, and whether differences exist in the use of social care services among individuals with different income sources at their disposal.

3.3 Other determinants

Other stratification determinants influencing the use of health and social care services, of interest in this research, include predisposing factors, as well as need factors. The following factors are discussed in the next paragraphs: gender, age, socioeconomic status, and marital status as predisposing factors, and health status and functional level as need factors.

3.3.1 Predisposing factors

The predisposing factors refer to individual level determinants influencing "the propensity toward [health care] use [...].", though "not directly responsible for health service use" (Andersen & Newman, 1973, p. 108). This includes gender, age, socioeconomic status and marital status.

Gender

A first predisposing determinant of interest here is gender. The link between gender and the receipt of care is twofold. On the one hand, gender differences in life expectancy and age at marriage make that the incidence of women living alone at the end of their life is larger than that of men. Thus, men have more access to informal care provided by their partner compared to women. In addition, the healthy life expectancy of women is lower than that of men. In 2010, the remaining health life expectancy of a 65-year-old woman was 9.7 years (overall life expectancy: 21.3 years), while the healthy life expectancy of a 65-year-old man was 10.4 years (overall life expectancy: 17.6 years) (Eurostat, 2014b). Women thus do not only face a longer period living alone at the end of their life, overall, they also face living longer in bad health – and thus in need of care – than men.

On the other hand, gendered expectations and norms about the receipt and provision of care generally disfavour married women. Traditionally, the role of care giver within the household was preserved for women, leading to care provided by the wife to her husband, and not or only to a limited extent the other way round. These norms on the provision and the receipt of care are still predominant among the older generations (Spitze & Ward, 2000), leading to an overrepresentation of wives providing care and husbands receiving this care and not the other way round. Consequently, men are found to receive overall more care than women, and more specifically, men receive more informal care than women (Declercq et al., 2009; Katz, Kabeto, & Langa, 2000; Larsson, Thorslund, & Kareholt, 2006). Women on their turn more often rely on care from outside the household, and receive more formal care than men (Declercq et al., 2009; Mutchler & Bullers, 1994). However, not all literature confirms these gender differences in the amount and type of care received. Several researchers have found little to no gender differences in the receipt of either formal or informal care (e.g. Auchincloss, van Nostrand, & Ronsaville, 2001; Davey, Savla, Sundström, Zarit, & Malmberg, 2007; Geerlings et al., 2005; Geerts, 2009).

Age

A second predisposing determinant of interest is age. The relationship between care and age is fairly straightforward. Growing older is strongly related to increases in physical dependency and problems with ADL and IADL. Consequently, with age the incidence of

care receipt is expected to increase. This holds for both formal care and informal care (Broese van Groenou et al., 2006; Colombo et al., 2011; Declercq et al., 2009). Further, the odds of receiving formal care instead of informal care are also found to increase with age (Davey et al., 2007; Geerlings et al., 2005; Geerts, 2009). Older age groups receive more formal care than younger age groups, both for personal and household care. This can be explained by the higher degree of care dependency of older groups, and by higher chance on the loss of the primary informal care giver with the decease on the individual's partner. Lastly, the amount of care also increases with age: the older, the higher the intensity of care one receives (Geerts, 2009).

Socioeconomic status

Thirdly, socioeconomic status is included as a predisposing factor of care use. In scientific research, this mainly refers to the level of education, combined with the occupational status of the last job and income (cf. supra). The link between socioeconomic status and care use is twofold.

First, socioeconomic status interacts with health and functional status, thus influencing the need for care services. Different studies have found that low socioeconomic status goes hand in hand with higher levels of mortality and morbidity, thus increasing the need for (health) care services (e.g. Cavelaars et al., 1998; Kunst, Groenhof, & Mackenbach, 1998; Mackenbach et al., 2008). A similar relationship is found between socioeconomic status, functional status and old age disability (i.e. difficulties with ADL and IADL). Among the elderly population, differences in educational level and occupational status are persistent in influencing the daily functioning during old age (Arber & Ginn, 1993; Berkman & Gurland, 1998; Huisman, Kunst, & Mackenbach, 2003; Rahkonen & Takala, 1998). In addition, a recent study of Hoeck et al. (2011) has found a strong relationship between socioeconomic status and frailty among the Belgian elderly population. Elderly with a low socioeconomic status were more likely to be frail than elderly with a high socioeconomic status, and thus have a higher need for health and social care services.

Second, socioeconomic status relates to (health) care use by differences in knowledge and access (health literacy). Research of Van der Heyden, Demarest, Tafforeau, and Van Oyen (2003) indicates that in Belgium those with a higher socioeconomic status have more contacts with specialists, dentists and physiotherapists than those with a lower socioeconomic status. Individuals with lower socioeconomic status have more contacts with a GP more often. This confirms findings from other studies across Europe and North-America (e.g. Veugelers & Yip, 2003). The main explanation for this is based on differences in the individual's knowledge and the awareness of the availability of (health) care services related to socioeconomic status. To a limited extent, also financial barriers could explain socioeconomic differences in (health) care use. Also interesting is the relationship between socioeconomic status, taking out private health insurance, and health care use. According to Schokkaert et al. (2007, p. 18) "there is a clear socioeconomic gradient in the

take-up of supplemental insurance". Individuals with a high socioeconomic status are more likely to get involved in private health insurance than low status individuals. Yet, no straightforward relationship between taking out supplementary health insurance and health care use was found.

Socioeconomic status can also be associated with the use of preventive health care services, like screenings, routine check-ups and blood tests, vaccinations, etc. Overall, the preventive health behaviour of high status individuals tends to be better developed than that of low status individuals. According to a research report of the Belgian Health Interview Survey of 2008, a higher socioeconomic status is related to a higher degree of vaccinations, a higher propensity of screening for cardiovascular diseases and diabetes, and a higher participation in cancer screening. Yet, among the population aged 65 and over, socioeconomic differences were not found to be significant in explaining differences in the population's vaccination rate (Demarest, Drieskens, Van der Heyden, & Tafforeau, 2010).

Lastly, socioeconomic differences are also found in the use of formal and informal care services. Overall, it is confirmed that those with a lower socioeconomic status use more informal care, while those with a higher socioeconomic status use more formally provided care (e.g. Auchincloss et al., 2001; Broese van Groenou et al., 2006; Declercq et al., 2009; Geerlings et al., 2005). One reason could be that informal care comes for free, while for formally purchased care services a (minimal) personal financial contribution has to be paid by the care receiver. Financial constraints thus could impose those with a lower socioeconomic status to draw on 'free' informal care, while those with a higher socioeconomic status have more options available to choose from informal and formal care services.

Marital status

Lastly, marital status is included as a predisposing determinant of health and social care services utilisation. Living together with a partner (or other household members) creates the opportunity for informal partner help, while those living single cannot fall back on such within-couple care. Research confirms this: living together with a partner induces the opportunities for informal care, while those living single more often fall back on formal care services because of the non-availability of informal carers (e.g. Auchincloss et al., 2001; Davey et al., 2007; Declercq et al., 2009; Pickard, Wittenberg, Comas-Herrera, Davies, & Darton, 2000). Further, marital disruptions, either because of death of the spouse or because of later-life divorce, has important consequences for the access and availability of informal care, since it is associated with the loss of the primary source of informal care (Glaser, Tomassini, Racioppi, & Stuchbury, 2006).

Note, however, that marital status, and by extension household composition, can also be considered as an enabling factor in explaining social care service use, in that the presence

of a partner or other household members induces the possibilities for informal care provision.

3.3.2 Need factors

Need factors refer to the individuals' health status and illness level or the probability of the occurrence of illness, and to one's functional level and problems with ADL and IADL (Andersen & Newman, 1973, pp. 109–110).

Both influence the use of health and social care services. The relationship between both is quite obvious: certain health or functional problems have to exist before the individual turns to health care services. Research shows that objective health and functional impairments, as well as self-rated poor health status are associated with a higher utilisation of health care and social care services (Declercq et al., 2009; Geerlings et al., 2005; Geerts, 2009; Larsson, Thorslund, Szebehely, & Daatland, 2004; Miller & Weissert, 2000). Further, frailty is also associated with the use of health and social care services. Even after adjusting for possible cofounding variables, Hoeck et al. (2011) found that in Belgium the use of health and social care services is higher among the frail than among the 'robust' (i.e. not considered as frail) elderly population.

4. Conclusion

In this chapter, we explored the mechanisms that provide protection against the functional dimension of dependency, which is found to be very important for the elderly population. Together with the income sources discussed in the third chapter of this report, these sources are found to be among the most important sources to protect the elderly population against the consequences of old age dependency.

From the packaging perspective, care is largely the result of claims that are made in the political sphere. Notions of citizenship and solidarity open the right to protection via public health insurance schemes, the receipt of health and social care services, etc. Overall, safeguarding the health of the population is considered as one of the main tasks of the contemporary welfare state, which makes the provision of health and social care services a government affair. However, also within the economic sphere the provision of health and social care can be claimed from a productivity perspective. Additional employer-provided health insurance schemes, for example, are reserved for employees and are considered to be a reward based on the productivity of those employees.

The care package includes two main components: health care services on the one hand, and social care services on the other hand. In Belgium these services overall are organised within the framework of the national health insurance scheme. An encompassing obligatory insurance scheme provides the majority of the population with financial

compensations for the use of health care services. This includes the wide range of medical and paramedical services focused on the health status of the population, like contacts with a GP, hospital treatments, preventive screenings, etc. In Belgium, health care services overall are offered by private health care providers. The social care services refer to the care services provided in residential care settings (i.e. residential care in elderly homes and nursing homes, as well as transmural care in day care centres and short stay centres) or the wide range of care services provided in the home of the care receiver (i.e. personal care and home help provided by formal and informal care givers).

The population can apply for (partial) financial compensations via the national health insurance scheme. More advantageous reimbursements are provided for specific groups, like elderly with a modest household income. To an important extent, also social care services (e.g. personal hygiene provided by professional care givers, etc.) are included in the national health insurance scheme. In addition, individuals can voluntary participate in private health insurance schemes providing complementary protection to the national health insurance scheme. In Belgium, this complementary insurance often covers the supplementary costs of hospital stays that are not included in the regular health insurance schemes. Further, supplementary private insurance for a wide range of health and social care services is offered via the health insurance funds. Lastly, in Flanders a public care insurance scheme has been set up, providing flat-rate benefits for individuals in need of (long-term) social care. Private care insurance schemes, however, are found to be less popular and only a very limited proportion of the population is involved in this type of private insurance schemes.

In the literature review we focused on the main determinants inducing differences in the use of health and social care services. This overview was based on the seminal health services utilisation framework of Andersen (1968), that distinguishes between predisposing, enabling and need factors to explain the use of health care services. The main factor of interest for this research, namely income, was found among the enabling factors. An important strand of the literature focuses on the relationship between income and the use of health and social care services. Despite the provision of extensive financial reimbursements for the use of these services, income related differences between individuals are found. Overall, higher income individuals are found to have easier and more access to health and social care services than lower income individuals. Further, high-income individuals draw more on formally provided social care services, while low-income individuals mainly depend on (cheap) informal care services.

Yet, in the existing literature the focus mainly is on the available income, and little attention is paid to the possible role of wealth (i.e. financial assets and property ownership) in the use of health and social care services. It could be expected however that the availability of wealth induces and eases the use of these services. After all, having an asset stock could bring about an increased consumption behaviour, leading to a higher use of health and social care services among individuals with a large wealth stock. Individuals with a more modest asset stock are obliged to a lower use of these services. Also the potential relationship between the type of income sources in the income package and the

type of protection one enjoys for the use of health and social care services needs more attention. For example, it could be expected that individuals with an employer-provided occupational pension also enjoy additional employer-provided health insurance. Again, this needs to be considered more in detail, since it could expose important connections between inequity in the income package and the care package. Investigating this relationship is particularly important for policy makers that are urging for an increased role for private pensions. After all, if a significant relationship exists between the composition of the income package and the composition of the care package, the more vulnerable elderly are expected to face a double disadvantage. Not only are they expected to be less protected against the financial dimension of old age dependency because of the limited coverage of their income package, they also are expected to be less protection against the functional dimension of old age dependency because of limitations in their care package. This points to a potential reproduction of inequality in old age.

In chapter 10 of this dissertation, extensive attention is paid to the care package of the Belgian elderly population. The focus is not limited to the composition of the care packages, but also on the intensity of the care use and, more importantly, the relationship between the income package and the care package is investigated. The focus will be on the potential contribution of assets and the income package composition to explain differences in the care packages among the elderly population. We investigate whether differences in the income package are significantly related to differences in the care package. This should fill in the existing gaps in the literature on inequity among the elderly population with regard to their use of health and social care services. However, before turning to the actual research results, we first address the main research questions and hypotheses in the next chapter.

CHAPTER 5

RESEARCH QUESTIONS AND HYPOTHESES

CHAPTER 5. RESEARCH QUESTIONS AND HYPOTHESES

As explained in the first chapter, this dissertation focuses on the protection of the elderly population against the two most important dimensions of old age dependency, namely financial dependency and functional dependency. In the previous chapters, extensive attention was paid to the main sources available to the elderly population to protect themselves against the negative consequences of these dimensions of old age dependency. These sources are clustered into the income package on the one hand, and the care package on the other hand. Further, attention was also paid to the differences in the level of protection enjoyed by the elderly population, and the origin of these differences. Lacks in the current research have been pinpointed, and will be used as the foundations of our proper research.

In this chapter, the main research questions and hypotheses are discussed. We distinguish three groups of research questions, that are elaborated further in the subsequent sections:

- concerning the old age income package;
- concerning the old age care package; and
- concerning the potential of both packages to protect against the financial and functional dimensions of old age dependency.

1. The old age income package

A first group of research questions addresses the in cash component of the old age protection package. The use of different income sources and the combination of these sources into income packages is investigated. Further, attention is paid to the main background determinants influencing the level and the composition of the old age income package, to explain inequalities among the elderly. Do the so-called 'rich' packages differentiate from the 'poor' packages with regard to their composition? Four specific research questions are formulated:

RQ 1a. How is the old age income package composed?

RQ 1b. How generous is the old age income package?

RQ 1c. What is the relationship between the composition and the generosity of the old age income package?

RQ 1d. What sociodemographic and socioeconomic background factors influence the composition and the generosity of the old age income package?

We expect to find diverse income package configurations because elderly can make claims in the three institutional spheres. In addition, because the rewards in the three spheres are not the same, also the generosity of the income packages is expected to be different.

The following hypothesis is derived from the literature: Elderly with a more diverse income package are expected to have a more generous income package ('rich' income package) than elderly with a low degree of diversification in their income package. Former research on the income package of the elderly population in several European countries showed substantial differences in the composition of the income packages of those in the higher income groups, compared to those in the lower income groups. The higher income groups were found to combine different, both public and private income sources, while those in the lower income groups mainly fall back on publically provided benefits. Also research specifically focused on the Belgian context (Berghman, Curvers, Palmans, & Peeters, 2007) found that the higher income groups have more access to additional retirement income sources than the lower income groups. Casey and Yamada (2002) showed that those with income from private sources are better off than those with income from public sources. The part of the population receiving only public social assistance income is least well off. In addition, we expect to find a relationship between the income package based on personal income sources and the extended income package, including asset sources. Elderly with a more diverse and a more generous personal old age income package are expected to have more access to asset sources. Further, we also expect that the (potential) revenues of assets is higher for elderly with a more generous personal income package.

A number of stratification determinants are included in the research to explain differences in the composition and the level of the old age income package: gender (sex), occupational status (based on the former labour market participation), socioeconomic status and living situation. Based on previous research, women are expected to have a lower level of in cash protection and a less diversified income package than men. These gender differences are expected to interact with occupational history. Secondly, those with complete labour market career, a limited number of career interruptions, a higher overall labour market income and having worked in favourable labour market sectors are expected to have a higher level of in cash protection and a more diverse income package than those with an incomplete labour market career, numerous career interruptions, lower overall labour market income and having worked in less favourable labour market sectors. Thirdly, a higher socioeconomic status is expected to go hand in hand with higher levels of in cash protection. Lastly, those married or living together with a spouse or partner are expected to be the best off with regard to in cash protection. An interaction with gender is expected in that single women are expected to have the lowest degree of diversification in their income package and the lowest level of income protection.

This research question contributes to the already existing literature in several ways. First, our focus is on the combination of income sources into income packages and the differences in these package among the elderly population, whereas the current research focuses strongly on separate income sources. Second, the inclusion of assets into the old

age income package is expected to be very important in explaining inequalities in the Belgian elderly population. A specific procedure will be used to included wealth in the old age income package, this will be discussed in chapter 7. Lastly, we will highlight the income package of a number of vulnerable groups, like older women, to investigate whether their vulnerable situation, which in current research is based mainly on lacks in their disposable income, persists when account is given to the extended income package including assets.

2. The old age care package

A second group of research questions focuses on the use of different types of care (i.e. the old age care package), and how this interacts with the protection provided by the old age income package. For this, a wide interpretation of care is used: besides health care, also social care services (i.e. personal care and home help) are addressed. What types of care are used by the older individual? How do elderly differ with regard to their care use? What role does the income package play in explaining the composition of the care package and the intensity of care use? What role does the income package play in explaining differences among the elderly population with regard to their care package? Again, we formulate two main research questions:

RQ 2a. How is the old age care package composed?

RQ 2b. What is the intensity of the use of health and social care services?

RQ 2c. What role does the old age income package play in explaining the composition of the care package and the intensity of the care services utilisation?

Significant differences are expected to exist in the older population concerning their care use. Mainly, these differences will depend on differences in their health and functional status, which can be directly related to their care use. However, the question is posed whether or not the old age income package, when controlling for differences in care needs, influences the care services used. Do elderly with a so-called 'rich' income package differ from those with a 'poor' income package with regard to their care package? Or, to put differently, are the inequalities among the elderly population with regard to their income package transposed to inequalities in their care package?

Based on the fairly extensive literature review on income and care, the following hypotheses are formulated. First, those with a more generous income package are expected to have more access to health care and a higher frequency of utilisation. Specific attention will be paid to the role of asset sources, since these sources are expected to be very important for the elderly population. Similarly, for social care, those with a less generous income package are expected to fall back more often on informal care, while those with more generous income packages have more opportunities to buy formal care

services. Lastly, it is investigated whether a more diverse income package results in a more diverse care package, irrespective of the income package's generosity and the individual's health and functional status. It is assumed that differences in the care package are explained by the composition of the income package, given similar income levels and similar health and functional status.

The strong focus on the role of wealth (i.e. financial assets and property assets) should contribute to the current strand of literature on the health and social care services use of the elderly population. Also the strong connection between the income package and the care package, and the search for a possible transfer of inequity from the income package to the care package is expected to be important for the debates on the protection of the elderly population against the risks related to old age dependency. This is discussed in chapter 10.

3. Guaranteeing protection against the financial and physical dimension of old age dependency?

A third group of research questions focuses on the extent to which the income and the care package meets the two main needs of the elderly population, namely protection against the financial dimension of old age dependency and protection against the functional dimension of old age dependency. Are elderly with a 'rich' protection package more capable of meeting their needs than those with a 'poor' protection package? Are differences in the income and care package of the elderly population translated into differences in the meeting of their needs? We formulate the following questions:

RQ 3a. To what extent does the old age income package provide protection against the financial dimension of old age dependency?

RQ 3b. What role does the old age care package play in providing protection against the functional dimension of old age dependency?

RQ 3c. What role does the old age income package play in providing protection against the functional dimension of old age dependency?

The meeting of the needs of the elderly population is considered as an observable, objective, and relative concept. As discussed in chapter 2, needs are situations of dependency, in which individuals are no longer able to take care of themselves. According to McKillip (1987, p. 10) "a need is the value judgement that some group has a problem that can be solved.". This implies that the needs concept has a normative character: what is conceived as a needy situation by one group or in one community is not automatically conceived as a needy situation by another group or community. In addition, needs are considered to be problematic situations, i.e. situations that do not correspond to the main expectations one has in a given situation. Lastly, the definition of McKillip (1987) points to

the fact that the needy situation or condition can be removed and that certain means and mechanisms can be used to overcome the needy situation.

In our research, we focus on two age related dimensions of need, namely the financial and functional needs that are related to old age. We investigate whether the mechanisms that are available to the elderly population (i.e. the income package and the care package) are sufficient in alleviating the potentially needy situation of the elderly population. This is closely related to the quality of the protection provided by the income and the care package. A high quality income package is expected to successfully protect the elderly population against financial destitution. Similarly, a high quality care package is supposed to protect the elderly population as good as possible against the negative dimension of functional dependency. An evaluation of the protection the income and the care package provides against the financial and functional needs in old age is included in chapter 8 (financial needs) and chapter 10 (functional needs).

CHAPTER 6

RESEARCH DESIGN, DATA AND POPULATION

CHAPTER 6. RESEARCH DESIGN, DATA AND POPULATION

In this chapter, the methodology of the research project is discussed. In the first section, we elaborate on the research design: a quantitative, cross-sectional analysis of secondary survey data. In the second section, we explain our choice to work with data from the Survey of Health, Ageing and Retirement in Europe (SHARE). In the third section, the main features of this data source are discussed (e.g. sampling, non-response and data quality).

1. Research design

The core of our research is a quantitative, cross-sectional analysis of secondary survey data. More specifically, data of the second research wave (2006-07) of the SHARE are used (cf. infra). As will be explained, our analysis is a single-case study of Belgium, with possibilities for comparison between the Belgian regions.

1.1 The use of secondary survey data

The research is conceived as an analysis of secondary survey data, more specifically as an analysis of data from the Survey of Health, Ageing and Retirement in Europe. The SHARE data cover a wide range of topics on old age (cf. section 2), and both the content and the free dissemination for scientific research has to encourage a large group of researchers to use the data.

One of the main advantages of working with secondary survey data is that it saves the researcher a lot of time and money in performing the research. Neither practical nor methodological issues on the data collection have to be tackled by the researcher, which creates the opportunity to concentrate on the data analysis and the research results (Glover, 1996; Hakim, 1982). Further, the use of secondary data avoids an increase in the number of surveys and the reporting burden among the population (Hakim, 1982). Also, the coverage of numerous topics; the inclusion of specific, hard to reach, population groups; and the opportunity for longitudinal and/or comparative research are advantages of working with secondary survey data (Burton, 2000b).

However, Glover (1996) also discerns three important disadvantages of working with secondary data: technical, institutional and epistemological problems. Technical problems include problems with the survey documentation and being not familiar with the data (Glover, 1996). We do not expect this type of problem to occur with the SHARE data,

because detailed information on the survey design, questionnaires, etc. is distributed via the website (http://www.share-project.org). Further, the central SHARE research team is present whenever questions might occur. Institutional problems, secondly, refer to problems with the accessibility of the data (Glover, 1996). However, because the SHARE data are distributed for free via the online SHARE Research Data Center, no institutional problems are expected to occur. Third, epistemological issues refer to the context and the perspective in which the data were collected (Glover, 1996). This is expected to be problematic in comparative research, in which it is harder for researchers to take account of the context of the data collection. Yet, we do not expect this to be problematic: the SHARE has been designed in a coordinated, harmonised way to minimise cross-national differences, and our research is a single-country study (cf. infra), thus limiting the epistemological problems that are expected to arise with the use of secondary data in comparative research.

In addition, the use of secondary data has important consequences for the content and the quality of the research. The researcher is limited to the survey content, and no nuances can be made (Burton, 2000b; Schutt, 2007). Working with secondary data thus always refers "a trade-off between the ease with which the research process can be initiated and the specific hypotheses that can be tested and methods that can be used." (Schutt, 2007, par. 8). Yet, the multidisciplinary character of the SHARE makes it well suited to answer our research questions. Also, when working with secondary data the researcher has no control over the quality, the reliability and the validity of the data collection. Burton (2000b) thus advises a careful consideration of the sample size, the sample design and the response rates in order to assess the quality of the secondary data (see section 3).

1.2 A quantitative analysis of survey data

The core of the research project is a quantitative analysis of survey data. Several reasons account for this. First, we want to provide a representative picture of the elderly population and their use of different sources to protect themselves against the financial and functional dimension of old age dependency. In that case, quantitative analytical techniques are considered as the most appropriate statistical techniques. We investigate the outlook and the differences in the income and care packages of the elderly population, with specific attention for the relationship between the old age income and care package. In our opinion, a quantitative analysis of survey data is the most appropriate technique to do so.

We will provide both descriptive and inferential statistics to investigate the relationship between the main variables. In chapter 8, we focus on the protection against the financial dimension of old age dependency. We investigate the existence of clusters of income sources (income packages). The generosity, as well as the quality of the protection provided by these old age income packages is examined. In chapter 10, the focus shifts to the functional dimension of old age dependency. A cluster analysis is used to investigate

whether clusters of health and social care services can be distinguished. We describe the composition of these care packages, and the quality of the protection that is provided against the functional dimension of old age dependency. We concentrate on the relationship between the income package and the care package.

The choice of the data analysis techniques depends on the research question and the variables involved in the analysis. More details on this are provided in the subsequent chapters. For the data analysis, the SAS-software package is used.

1.3 A cross-sectional research design

Given our focus on the protection of the older population against the financial and functional dimensions of old age dependency, and the research questions formulated in chapter 5, we consider a cross-sectional research design as the most appropriate for our research. A cross-sectional research design implies that we focus on the existence of differences between individuals at a given point in time (Burton, 2000a). In addition, the use of only one moment of data collection implies that our data and research results are not influenced by policy changes. In order to get to this cross-sectional research design, we select the second wave of SHARE data, which has been collected in 2006 and 2007 (cf. infra).

1.4 A single-country study

Our research focuses exclusively on Belgium. Such a single-country study is defined by Landman (2008) as “any study in which a single country forms the basic unit of analysis, but which may also be broken down into smaller units across time and space, by examining sub-national variation across states in federal countries, other administrative units in unitary systems, as well as other appropriate units of analysis, such as individuals.". The selection of the country under study should be considered carefully, to make sure that the study contributes to the wider research field. This contribution can be quite diverse, going from the fact that a single-country study can provide input for further multi-country research, to the fact that classifications can be developed or that new hypotheses can be formulated to nurture new “research puzzles” (Landman, 2008).

We aim to develop a new viewpoint on the old age protection against the financial and functional dimension of old age dependency from the packaging approach (cf. chapter 2). This approach can proof to be useful in later studies comparing welfare states and the protection of their elderly population. Given the conservative corporatist welfare state character of Belgium, we expect to find an interplay between different protection mechanisms. According to Esping-Andersen’s welfare regime typology (1990), an important role is preserved for the state in the welfare production, via, among others, the provision of pensions to the elderly population. Further, private income sources (e.g.

private pension plans) gain interest because of the ongoing debate on the financing of public pensions. Also the family holds an important role in the welfare production, especially for the provision of social care.

However, the single-country character of this study does not rule out entirely the comparative aspect (Kennett, 2004; Landman, 2008). In Belgium, the responsibilities for social care are assigned to the regions, while the federal government is responsible for income matters (e.g. retirement incomes) and for everything that is related to the national health insurance scheme.[50]

2. Exploration of the available data sources[51]

In this section we explore the potential of different data sources to answer the research questions formulated in chapter 5 and to make an informed choice on the data used. Both survey (2.1) and administrative data (2.2) are discussed.

2.1 Data from survey research

Information on the protection of the elderly population against the main dimensions of old age dependency can be found in both general surveys and surveys focusing on the elderly population. Table 6.1 gives an overview of the most important Belgian surveys that could be interesting for our research.

[50] Art. 5 §1 Law of 8 August 1980 on the reformation of the Belgian institutions (B.A. 15.08.1980).

[51] An extensive overview of different data sources on a wide range of aspects of the ageing process is provided within the framework of the Joint Programming Initiative (JPI) "More Years, Better Lives - The Challenges and Opportunities of Demographic Change". More information on this project and an overview of the available data sources can be consulted online at http://www.jpi-dataproject.eu/

Table 6.1. Overview of most important Belgian surveys for our research

	Population	Timing	Content	
			Income	Care
Surveys on the overall population				
PSBH	Population in private households	1992-2002 (11 waves)	X	(x)
EU-SILC	Population in private households	2003-now (11 waves)	X	(x)
HIS	Entire population	1997-now (5 waves)	(x)	X
Surveys on the elderly population				
LOVO	55+ in private households 75+ in collective households	2001, 2004	X	X
VOZS	65+ in private households, with care needs	2009		X
SHARE	50+ in private households	2004-now (5 waves)	X	X

Note: X= good coverage (x)= limited coverage

On the one hand, there are surveys that focus on the entire population. The Panel Study of Belgian Household[52] (PSBH) (1992-2002) is a longitudinal survey on income, housing, labour, health and education of the Belgian population. Elderly living in private households are included in the research population, while elderly residing permanently in care facilities are excluded from the research population. Quite detailed information is collected on the income package, but information on the care use remains rather limited. Further, since the last research wave was in 2002, the data can blamed to be outdated. Since 2003, the PSBH is integrated in the European Statistics on Income and Living Conditions (EU-SILC). As was the case with the PSBH, the EU-SILC contains rather detailed information on the income package, but not on the use of health and social care services. This makes the EU-SILC not appropriate for our research, since we focus on both income and care. Another survey of interest is the Belgian Health Interview Survey (HIS), a repeated cross-sectional survey that is conducted since 1997 among approximately 10000 Belgian citizens. In 2004 and 2008 an additional sample of the older population was drawn to get a more representative picture of this population group. Both elderly in private and collective households are included in the sample framework. The HIS collects quite detailed information on health and functional status and on the use of health and social care services, but information on the income package is rather limited and restricted to the household level.

On the other hand, some potentially interesting surveys focus explicitly on the elderly population. In Flanders, between 2001 and 2004, the Survey on the Living situation of Flemish Elderly [LeefsituatieOnderzoek Vlaamse Ouderen, LOVO] collected information on different aspects of the daily life of elderly living at home (55+), and in institutions (75+). Both income and care were covered, but the research population was limited to elderly living in Flanders. More recently, in 2009 a survey on Flemish elderly receiving home care was executed (the Flemish Elderly Care Survey [Vlaamse OuderenZorgStudie, VOZS]). Yet, given the broad focus of our research, this population demarcation makes it less suited for

[52] The PSBH was integrated with the European Community Household Panel (ECHP) in 1994.

us. Lastly, since 2004 the SHARE collects information on different aspects of the elderly population, including income and care use. This makes the SHARE well suited for our research. However, some limitations have to be taken into account, like the exclusion of institutionalised elderly in the Belgian research population (cf. section 3.2).

2.2 Register data from administrative sources

Also register data can be used to answer certain research questions. In Belgium, register data on a wide range of social protection topics are collected in the Datawarehouse Labour Market and Social Protection [DWH LM&SP]. These data include, among others, information on first and second pillar pension payments (from the Pension Register), social assistance for elderly, wages after retirement, etc.

One of the major advantages of register data is the high level of detail and accuracy (Palmans, Peeters, & Berghman, 2006). There are no errors with the reporting of income, like often is the case with surveys (e.g. due to memory effects or refusal to answer income questions). For our research project, for example, the Pension register includes information on first and second pillar pensions[53], additional social security and social assistance payments, like the allowance for heating, etc. However, because no information is available on private pension plans, individual life insurance, the receipt of early retirement benefits, home ownership, etc. no complete picture can be drawn of the entire old age income package (Palmans et al., 2006). Another important advantage of register data is the coverage of almost the entire population. Individuals living in residential (care) settings like nursing homes are not excluded, while this often is the case in surveys (Peeters, Debels, & Verpoorten, 2013). However, one must take into account that even register data do not grasp the entire group of institutionalised elderly because of the divergence between the registered and the actual living situation. For example, when in an older couple one of both partners moves to a residential care facility, this move is not always reported to the authorities. In this case, the older person is not registered as living in an institution, although in reality he/she is living in such an institution. Consequently, even in register data the number of elderly living in an institution is underestimated.[54]

[53] Yet, one should note that this holds only for former employees; the information available on the occupational pension protection of the self-employed elderly population is fairly limited and quite sensitive to errors (Palmans, Peeters, & Berghman, 2006).

[54] On 1/1/2009, 102978 persons aged 60 years and older were registered as being part of a collective household in the National Register (Crossroads Bank for Social Security, 2014). However, the NIHDI reported 128245 authorised beds in residential care facilities (situation on 1/1/2009) (Rijksinstituut voor Ziekte- en Invaliditeitsverzekering, 2013). This point to an underestimation of the institutionalised population with almost 25000 persons.

Moreover, the National Register does not allow to distinguish in the type of collective household, so elderly in residential care facilities cannot be extracted.[55]

However, some disadvantages of register data cannot be neglected. First, register data are not free accessible: data requests are expensive and time-consuming, specifically when one wants to receive a lot of detailed information. In addition, analysing register data is complex and often indistinct, because register data are not collected for scientific purposes. Lastly, register data do not capture every facet of the protection of the elderly population against the financial and functional dimensions of old age dependency. Certain income sources are not registered, and little information is collected on the use of health and social care services. Also subjective evaluations (like wellbeing) are not included.

Ideally, working with a combination of register and survey data would provide the best results. However, until now in Belgium such combinations are not widely available, although attempts have been made to link register data with data from the EU-SILC.

3. Survey of Health, Ageing and Retirement in Europe

As discussed in the previous section, we have chosen to work with data from the SHARE, a multi-disciplinary survey on different aspects of the daily lives of older people all over Europe. Information is collected on both the income sources of the elderly population and the use of health and social care services. Further, the free dissemination of the data facilitates the access and use of these data.

In this section, we provide some necessary information on the SHARE. In 3.1 the development of the SHARE is discussed. Attention is also paid to our focus on the second wave of data collection. In 3.2, the sample design - with a specific focus on the Belgian sample in the second wave - is covered. The data collection and the structure of the dataset is explained in 3.3, and in the last section we focus on the quality of the data, with specific interest in the limitations of the data source, item and unit non-response (3.4).

3.1 An introduction to the SHARE

The SHARE was initially designed to enlarge the understanding of ageing and its effects on individuals within the diverse cultural setting of Europe (Börsch-Supan & Jürges, 2005). Therefore, a longitudinal, multi-disciplinary and multi-country survey was set up to build

[55] For the elderly population collective households refer mainly to residential care facilities, and only to a very limited extent to prisons and convent communities (Peeters, Debels, & Verpoorten, 2013).

a micro-data database on different aspects of the ageing process (e.g. health status, economic status, family networks, etc.).

The first steps towards the SHARE were taken by the European Commission, which in 2000 urged for the development of a European longitudinal ageing survey to collect data on topics like health care, economic status and social protection for the design of effective policies in these fields.[56] In 2002 the actual development of the SHARE took off, which resulted in a first wave of data collection in 11 European countries in 2004-05. In 2006 a second wave of data collection started in 13 countries. A third wave of data collection took place in 2008-09, this time focusing on the people's life histories (SHARELIFE). A fourth and fifth wave of data collection were organised in 2010-11 and in 2013-14 (see figure 6.1).

Figure 6.1. SHARE Waves of data collection and participating countries

WAVE 1 SHARE	WAVE 2 SHARE	WAVE 3 SHARELIFE	WAVE 4 SHARE	WAVE 5 SHARE
2004-05 Austria Germany Sweden The Netherlands Spain Italy Denmark Switzerland Belgium Greece France **2005-06** Israel	**2006-07** Austria Germany Sweden The Netherlands Spain Italy Denmark Switzerland Belgium Greece France Czech Republic Poland **2008** Ireland	**2008-09** Austria Germany Sweden The Netherlands Spain Italy Denmark Switzerland Belgium Greece France Czech Republic Poland	**2010-11** Austria Germany Sweden The Netherlands Spain Italy Denmark Switzerland Belgium Greece France Czech Republic Poland Finland Portugal Slovenia Hungary	**2013-14** Austria Germany The Netherlands Spain Italy Denmark Switzerland Belgium France Czech Republic Israel Estonia Slovenia

For our research, we selected data from the second wave of the SHARE. At the moment we started our research, in 2011, only the first three rounds of the SHARE data collection were available. Only the first two waves contained the information on incomes and care

[56] COM(2000)846 Communication from the Commission to the Council and the European Parliament: The contribution of public finances to growth and employment: Improving quality and sustainability.

we needed for our research. In addition, in the first wave gross income values were registered, while in the second wave net income values were registered. Net incomes give a more accurate picture of the income situation, and are expected to be less biased than gross income values because respondents tend to know better what they actually receive on their bank account (after taxes and social security contributions: net incomes) than what they would have received before taxes and social security contributions (gross incomes). Lastly, the use of the second wave of data collection had larger opportunities to use the retrospective life history information in the SHARELIFE. This will be explained more in detail in chapter 8.

3.2 Target population, sampling and sample design

In this section we discuss the SHARE target population, the sample population and the realised sample. We will also stress the limitations of the sampling and the potential consequences for our research.

3.2.1 The target population

The SHARE target population of households refers to all households with at least one member aged 50 or over, "speaking the official language of the country and not living abroad or in an institution such as a prison during the duration of the field work" (Klevmarken, Swensson, & Hesselius, 2005, p. 30). The target population of individuals refers to all individuals aged 50 and over, "speaking the official language of the country and not living abroad or in an institution such as a prison during the duration of the field work, *and their spouses/partners independent of age*" (Klevmarken et al., 2005, p. 30).

In Belgium, the target population of households in the first wave referred to all households with at least one French speaking household member born in 1954 or earlier living in Wallonia and Brussels; and all households with at least one Dutch speaking household member born in 1954 or earlier in Flanders. The target population of individuals included all French, resp. Dutch speaking residents born in 1954 or earlier and their spouses/partners living in Wallonia and Brussels, resp. Flanders. In the second wave, the respondents of the first wave were recontacted.

Restrictions in the Belgian SHARE target population

The demarcation of the target population has important consequences for our study. The following groups of elderly are excluded from the target population in the Belgian SHARE:

- elderly living in collective households (residential care facilities);
- elderly not able to speak Dutch or French;

- elderly residing in the German speaking Community.

Firstly, elderly living in collective households are excluded from the Belgian target population (Klevmarken et al., 2005; SHARE Project, 2009). In Belgium, this largely corresponds to the elderly living in a residential long-term care facility like a nursing home. The exclusion of this group of elderly stems from the sampling frame (cf. infra), which is based on telephone listings including only private households. Elderly residing in other types of adapted housing, like service flats, sheltered housing or housing with services, are not excluded from the sample frame, since these types of adapted housing are not conceived as collective households. Based on the OECD Health Data (2010), we estimated that about 6% of the population aged 65 and over permanently lives in a residential care facility, and thus is excluded from the target population. The bias even grows when the oldest elderly are considered, since on average 20% of this group permanently resides in a nursing home.[57] Their high degree of care dependency, the limitations in their physical and mental capacities, having little control on their income situation (Dey, 1997), the lack of cooperation of the residence administration and staff (Callens & Pauwels, 2006), makes that institutionalised elderly are often excluded from (survey) research.

Secondly, elderly not able to speak one of the national languages (i.e. Dutch or French) are excluded, because the questionnaires are made up in one of both languages. Consequently, mainly immigrants are excluded and remain under the radar.[58] An analysis by De Luca and Peracchi (2005) on data from the first wave of the SHARE showed that 13% of the households not fulfil the eligibility criteria because of language barriers.[59] Yet the exact scale of the language based exclusion is not clear, because no information is available on the language skills of the Belgian older population.

Thirdly, elderly living in the German speaking part of Belgium are not included in the target population because they were not part of the Belgian sample framework (cf. infra). This means an additional exclusion of about 0.7% of the research population.[60]

3.2.2 The sample population, sample frame and sample design

Whereas the Belgian SHARE target population refers to all households with at least one French or Dutch speaking member born in 1954 or earlier, and all French or Dutch

[57] The OECD Health Statistics refer to the Belgian situation in 2005.
[58] Also other barriers contribute to the exclusion of foreign elderly: communication problems, cultural differences, unfamiliarity with the wide range of care facilities, etc. (Talloen, 2007).
[59] The analysis included Denmark, Germany, the Netherlands, Italy, Spain and Sweden (De Luca & Peracchi, 2005).
[60] Calculation based on national population data (Algemene Directie Statistiek en Economische Informatie, 2010).

speaking residents born in 1954 or earlier and their spouses/partners, some additional restrictions in the population rose from the sample frame and the sample design. We will first elaborate on the sample frame and sample design, and in addition we discuss the consequences for the sample population and the broader research.

The sample frame: list of municipalities, telephone directories and the National Register

In Belgium, the overall sample frame was the same in Flanders, Wallonia and Brussels: in the first stage, the sample frame was a list of municipalities, and in the second stage a list with telephone numbers. The seven German speaking municipalities in the east of Wallonia were not included in the list of municipalities. Obviously, the list with telephone numbers only included individuals with a telephone number, but in addition also business numbers, and telephone numbers of, for example, schools, government institutions, hospitals, etc. were included (cf. infra). The use of a telephone listing has several limitations. Telephone listings require a serious amount of cleaning (telephone numbers not referring to private households, as well as double entries had to be removed), and individuals without a telephone number are not included (undercoverage). This affects the representativeness of the sample, though the extent of this is not clear.

In Flanders, an additional sample was drawn from the National Register.[61] It is not clear why the National Register was not used as the initial sampling frame, because this would have avoided the problems related to the use of telephone directories in the sample framework. One should note that here we are confronted with one of the main disadvantages of working with secondary data (cf. supra): the researcher has no control on the decisions made regarding the sample framework and the sample design.

A three-stage sample design

In Belgium, a three-stage sampling design was used in the first wave of the SHARE (SHARE Project, 2009):

- Stage 1: selection of municipalities;
- Stage 2: selection of households within selected municipalities; and
- Stage 3: screening of selected households for age-eligibility.

In the first stage, municipalities were selected from a list of municipalities. This was done separately for Wallonia, Brussels and Flanders. Five large cities (i.e. Charleroi, Namur, Liège, Antwerp and Ghent) were considered as separate strata and were included as such

[61] This additional sample was made possible because additional financial resources were made available by the Flemish government for an extension of the SHARE research (SHARE Project, 2009).

in the sample of municipalities. Their selection probability was set to 1, which is larger than when the selection probability would take account of the (age) structure of the population. Consequently, elderly living in one of these big cities have a higher chance of being part of the final sample, and - due to the selection with certainty - are expected to be overrepresented in the sample. In Flanders and Wallonia, the other municipalities were selected via a simple random sampling without replacement. Flanders and Wallonia were considered as two separate strata. The selection probabilities were set proportional to the number of private households with at least one person born in 1954 or before in the municipality versus the total number of private households with at least one person born in 1954 or before in the stratum. Brussels initially was selected as a whole (selection probability=1). However, an additional sample was drawn using the procedure to select the remaining municipalities in Wallonia and Flanders (selection probability proportional to the number of households with at least one member born in 1954 or before). Making the selection probability dependent on the size of the older population implies that municipalities with larger older populations have a higher probability of being selected than municipalities with a smaller elderly population. This should contribute to the representativeness of the realised sample.

In the second stage, households within the selected municipalities were sampled via a simple random sampling without replacement. Cleaned telephone directories were used for the selection of addresses.[62] The number of selected addresses differed between the strata. For the large city strata (cf. supra: Charleroi, Namur, Liège, Antwerp, Ghent, Brussels' initial sample), the selection probability of an address (household) was set proportional to the number of private households with persons born in 1954 or before in the stratum and the total number of private households with persons born in 1954 or before in the region (Wallonia, Brussels or Flanders). Thus, although in the first stage of sampling no account was given to the population structure, this was the case in the second stage of the sampling. In all other municipalities in Flanders and Wallonia and in the additional sample in Brussels, a fixed number of addresses (households) was selected: 100 per municipality in Flanders and Wallonia, and 200 per municipality in Brussels. Consequently, households in smaller municipalities have a higher probability of being included in the sample than households in larger municipalities, since the sampling in this stage does not account for population size or age structure.

[62] The cleaning of the register included the following (SHARE Project, 2009): business numbers were not deleted, because often small business owners share their home address with their business address; double entries were removed; addresses clearly referring not to private households were removed. The research team assumed that the number of addresses in the cleaned telephone list refers to the number of private households in the National Register. This does, however, not match completely with reality, because private households without a telephone are not included in the telephone directory, while they are included in the National Register. Further, addresses referring to private households could have been deleted accidently during the cleaning process. Thus, the telephone directories contain only a (although large) part of the population in the National Register.

In the third stage of the sample design, the selected households were screened for age eligibility via information provided by a commercial firm. This firm could identify the age eligibility for about three quarters of the sampled households; and the remaining quarter was contacted by the interviewers to determine their age eligibility (SHARE Project, 2009).[63]

The selection probabilities in both stages of the sample design, and the overall selection probability is shown in Table 6.2. In every stratum account is given to the population size and the age structure of the population, either in the first or the second stage of sampling. The sampling probabilities are not the same for each household in the sample frame, yet, they are proportional to the number of households with persons born in 1954 or before, and thus take account of the population size.

Table 6.2. The sampling probabilities of households in the Belgian SHARE

Stratum	Stage 1	Stage 2	Overall sampling probability
Brussels - initial	1	$n\ (A_s / A_t) / T_{m\_B}$	$n\ (A_s / A_t) / T_{m\_B}$
Brussels - additional	$c_s\ (A_m/A_t)$	$200 / T_{m\_W}$	$(200\ c_s\ A_m) / (A_t\ T_{m\_W})$
Charleroi	1	$n_W\ (A_s / A_t) / T_{m\_W}$	$n_W\ (A_s / A_t) / T_{m\_W}$
Namur	1	$n_W\ (A_s / A_t) / T_{m\_W}$	$n_W\ (A_s / A_t) / T_{m\_W}$
Liège	1	$n_W\ (A_s / A_t) / T_{m\_W}$	$n_W\ (A_s / A_t) / T_{m\_W}$
Wallonia – rest	$cs\ (A_m/A_t)$	$100 / T_{m\_W}$	$(100\ c_s\ A_m) / (A_t\ T_{m\_W})$
Antwerp	1	$n_F\ (A_s / A_t) / T_{m\_F}$	$n_F\ (A_s / A_t) / T_{m\_F}$
Ghent	1	$n_F\ (A_s / A_t)\ / T_{m\_F}$	$n_F\ (A_s / A_t)\ / T_{m\_F}$
Flanders – rest	$cs\ (A_m/A^t)$	$100 / T_{m\_F}$	$(100\ c_s\ A_m) / (A_t\ T_{m\_F})$

Note: c_s = Number of selected municipalities per stratum
A_m = Number of private households with at least one person born in 1954 or before in municipality
A_t = Total number of private households with at least one person born in 1954 or before in the region
n_W = Overall gross sample size for Wallonia and Brussels
n_F = Overall gross sample size for Flanders
T_{m_w} = Number of entries in the cleaned telephone listing for Wallonia
T_{m_F} = Number of entries in the cleaned telephone listing for Flanders
T_{m_B} = Number of entries in the cleaned telephone listing for Brussels

Source: SHARE Project (2009, p. A28)

In the second wave of the SHARE, the initial panel of respondents was revisited. Elderly no longer willing to participate or deceased were excluded. In Wallonia and Brussels, an additional sample was drawn with an overrepresentation of individuals born in 1955 and 1956 to get an adequate proportion of this age group in the overall sample (Börsch-Supan & Jürges, 2008; De Luca & Rossetti, 2008). This was not done in Flanders, leading to an under representation of the elderly born in 1955 and 1956. However, because we will limit our research population to those aged 60 and over at the moment of the interview (born in 1947 or before) (cf. infra), this has no consequences for our research.

[63] Note that in the additional Flemish sample, no age eligibility screening was necessary because this information is included in the National Register.

Lastly, we should stress that the focus of the sample design on households instead of on individuals can have consequences for our research. Singles and couples have equal probabilities on being part of the sample, which could lead to an overrepresentation of singles, and thus affect the representativeness of the research results. However, within couples the spouse/partner of the respondent is "automatically" included in the sample, irrespective of his/her age. This gives some counterbalance to the overrepresentation of singles in the sample frame.
To take into account the different selection probabilities in the data analysis, the SHARE research team provides design weights, that are constructed as "the inverse of the probability of being included in the [...] sample." (De Luca & Rossetti, 2010, p. 23). These weights are the same for households and individuals because "the probability of including any of the eligible individuals in a household is the same as the probability of including the household." (Klevmarken et al., 2005, p. 34). These weights have to compensate for the differences in the probability of being included in the sample.

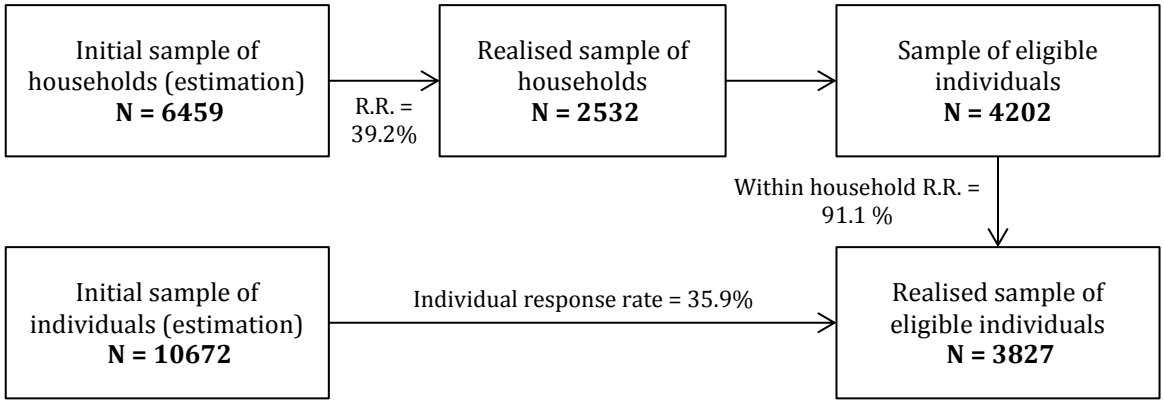
3.2.3 The realised sample

Little information is available on the size of the sample population during the different stages in the sample procedure. For example, no exact information is available on the number of age-eligible households that remain after the third stage of the sampling procedure. Yet, using the limited information provided by the SHARE research team, we can estimate the size of the initial sample of households and the initial sample of individuals (see Figure 6.2).

According to information on the first wave probability samples[64], a household response rate of 39.2% was reached in Belgium; and 2532 households were actually interviewed. Consequently, the initial sample of age-eligible households contained an estimated 6459 households. Further, the sample of interviewed households contained 5081 individuals, of which 4202 were eligible according to the SHARE target population criteria (cf. supra). Each household thus included on average 1.66 eligible individuals. When we assume that the average number of eligible household members is the same in all households[65], the initial sample of eligible individuals included 10672 potential respondents. Based on the estimated initial sample of individuals and the realised sample of respondents (N=3827), we estimate a relatively low individual response rate of about 35.9%.[66]

[64] This information can be consulted at the SHARE website (http://www.share-project.org/data-access-documentation/sample.html).
[65] Similar to the approach of De Luca and Peracchi (2005).
[66] To illustrate, in the 2004 round of the European Social Survey the response rate was 61.4% (European Social Survey, no date), while in the EU-SILC the individual response rate in 2004 was 47.7% (*Quality Report Belgian SILC 2004*, 2005).

Figure 6.2. From the initial sample of households to the realised sample of individuals in the first wave of the Belgian SHARE



Note: R.R. = Response rate

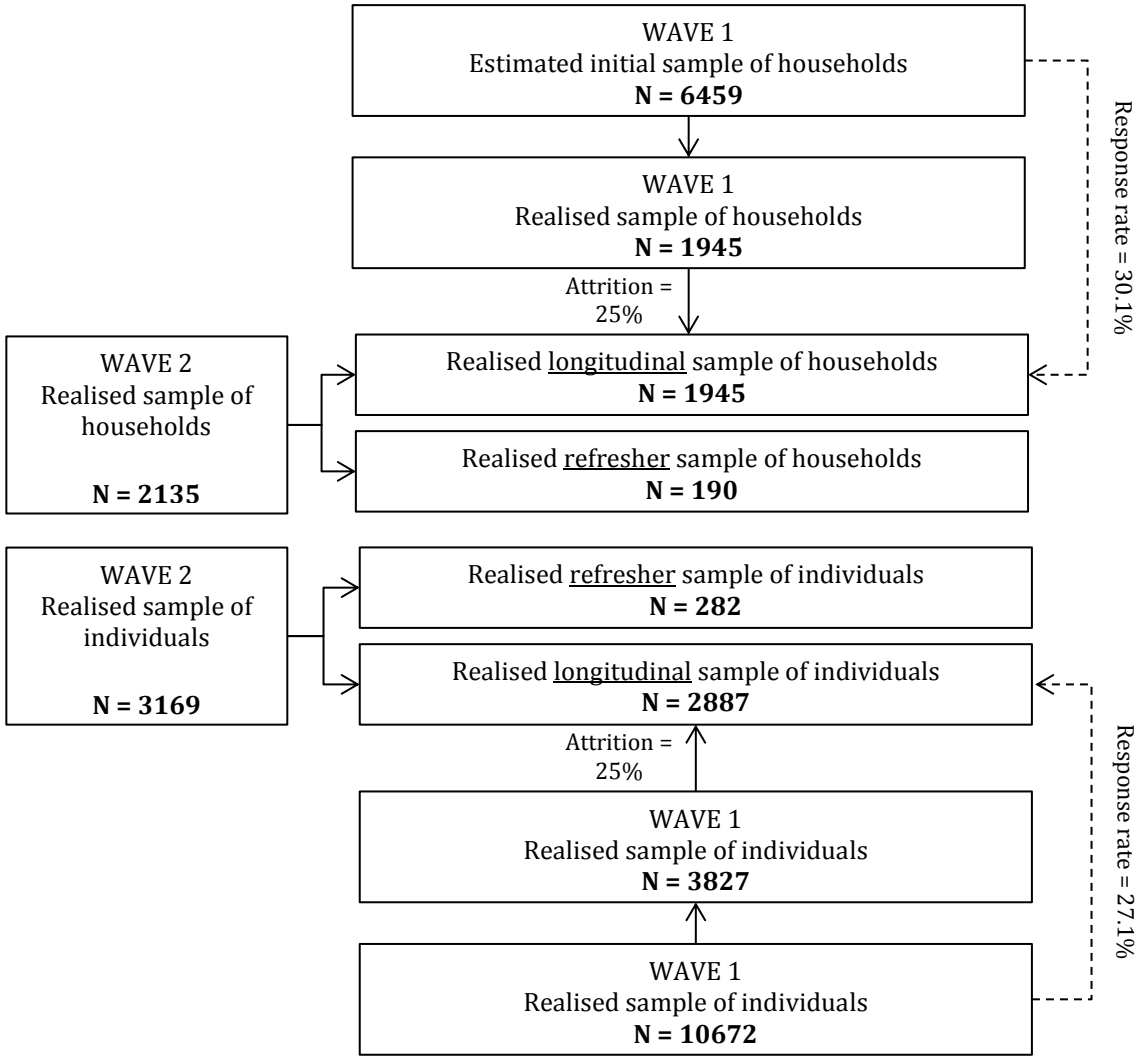
Source: Author's calculations based on SHARE wave 1

One should note that the average household response rate for all countries in the first wave of the SHARE was importantly higher than in Belgium (61.6% vs. 39.2%). The Belgian within-household response rate, however, was somewhat larger than the SHARE average (91.1% vs. 85.3%). Moreover, the realised individual response rate was very low in Belgium when compared to the other participating countries. According to a survey participation analysis of De Luca & Peracchi (2005) for ten SHARE countries[67], the average individual response rate was 48%, while this was only 35% in Belgium. This low initial response rate has important consequences for our research, because non-response does not tend to be at random, but selective, which means that the situation of those not participating in the survey differs from those in the survey. However, because we do not have information on the non-participating part of the initial sample, we cannot assess how important the differences between the realised sample and the target population are.

In the second wave, the initial respondents from the first wave were recontacted to participate (longitudinal sample). In Wallonia and Brussels an additional sample was drawn to include individuals born in 1955 and 1956; this however was not done in Flanders. The refresher sample makes up about 9% of the realised sample of individuals and households (190 households were introduced in wave 2, resulting in 282 individuals interviews). Attrition between the first and the second research wave was considerable: about 25% of the respondents from the first wave did not participate in the second wave. The response rate thus decreased even more: from 35.9% in the first wave to 27.1% in the second wave for the sample of individuals, and from 39.2% to 30.1% for the household response rate.

[67] The countries included were France, Denmark, Greece, the Netherlands, Germany, Austria, Italy, Sweden, Spain and Switzerland.

Figure 6.3. Decomposition of the second wave of the Belgian SHARE



Source: Author's calculations based on SHARE wave 2

Within the realised sample of the second wave, we select a more limited research population, targeted to our research questions, as discussed in chapter 5. The research population thus refers to the population aged 60 years and over at the moment of the

interview (born in 1947 or before)[68], living alone or with a spouse/partner that is also aged 60 years or over. The reason why we limit the research population to elderly living alone or with a partner is that we wish to take account of financial solidarity within couples, and thus need complete income information on both partners (cf. chapter 8). And, given our focus on the elderly population, only couples where both partners are 60 years or older are included in the research population.

3.3 Data collection and survey structure

The data collection period was preceded by a long period of testing and fine-tuning of the survey instruments and the question wording. Research teams from different countries cooperated to guarantee the international comparability of the data collection.

The data were collected via face-to-face Computer Assisted Personal Interviews (CAPI). Blaise software, a "computer-assisted interviewing system tool (…) developed for the Windows operating system by Statistics Netherlands and (…) designed for use in official statistics." (Das, Vis, & Weerman, 2005, p. 12), was used to support the interviews. Each interview was conducted at the home of the respondent, and the answers were immediately entered into the computer by the interviewer. The face-to-face interview was complemented with a drop-off questionnaire, that had to be filled in by the respondent after the interview.

For Belgium, the interviews were performed under the supervision of the Centre for Longitudinal and Life course research [Centrum voor Longitudinaal en Levensloop Onderzoek] for Flanders, and the Demographic Family Panel [Panel Démographique Familiale] for Wallonia and Brussels. CAPI made the manual input of the data after the interviews redundant. All the SHARE data (interviews, questionnaires, interviewer information, etc.) were gathered and coordinated by CentERdata, a Dutch institute for data collection and research (Tilburg University, the Netherlands) (Das et al., 2005). In cooperation with the Mannheim Research Institute for the Economics of Ageing, a first round of data processing was performed, the data were cleaned and transformed to data

[68] The main demarcation criterion is that of age: The research population is limited to older individuals. In general, the elderly population is referred to as that part of the population that no longer is economically active. Often, this refers to the moment of retirement, the moment at which one becomes eligible to a (public) retirement pension. Based on national and international - though not formally agreed - standards on old age, we restrict the elderly population to that part of the population aged 60 and over. For example, the United Nations, as well as the European Commission and the Flemish Government take the age of 60 as the cut-off point to differentiate the elderly population from the active population (European Commission, 2010b; Kabinet van Vlaams Minister van Welzijn, Volksgezondheid en Gezin, 2010; United Nations Department of Social and Economic Affairs, 2010).

files ready for analysis. Finally, the data were launched for free dissemination among researchers all over the world.[69]

Given the wide range of topics covered in the SHARE and the fact that information was gathered both on the individual and on the household level, the structure of the data is quite complex. The dataset consists of different data files, which can be linked with a personal identification number. An overview of the structure of the data and the different modules is included in appendix 1.

3.4 Assessment of data quality

When working with secondary data, the researcher must check the quality of the data before starting the actual analyses to guarantee the reliability of the research results.

Survey quality can be affected by different types of errors. In his taxonomy of survey errors, Bethlehem (2009) distinguishes between sampling errors and non-sampling errors. Sampling errors are linked to the sampling design, while non-sampling errors refer to errors during the data collection (observation errors), and errors like undercoverage and non-response (non-observation errors). Working with secondary data like the SHARE implies that the researcher cannot control the occurrence of survey errors. However, the researcher must be aware of their existence, and whenever necessary and possible, additional analyses must be performed to validate the research results and to improve the overall quality of the research.

3.4.1 Dealing with survey errors

Several mechanisms were built into the SHARE research design and data collection to minimise the occurrence of survey errors (see Table 6.3 for an overview).

[69] For more information of data access and use, consult the SHARE Research Data Center website (http://www.share-project.org/).

Table 6.3. Strategies to minimise the occurrence of survey errors in SHARE

Type of error		Strategy
Sampling error		Probability sample
		Simple sample design
Observation error	Overcoverage	Assessment of age eligibility
	Measurement	Testing of questionnaire
		Use of answering cards
	Processing	Computer assisted interviewing
Non-observation error	Undercoverage	Number of contact attempts
	Unit non-response	Refusal conversion strategies
		Participation enhancing strategies
	Item non-response	Unfolding brackets

First, the use of probability samples and simple sample designs had to minimise the occurrence of sampling errors. Yet, as discussed in the previous section, the Belgian three-stage sample design was not that simple and the decisions made could induce errors in the data (e.g. the sampling of households versus individuals; the selection with certainty of big cities; ...). Further, the central SHARE research team made recommendations on the sample size[70], the expected response rate and the intended number of interviewed households (cf. supra) to reach the required level of precision in the research results. However, the quite low response rates could have consequences for the representativeness of the research results (cf. supra).

Second, several mechanisms were built into the survey instruments to minimise the occurrence of observation errors. To avoid overcoverage (i.e. the inclusion of respondents that do not belong to the target population), age eligibility was assessed quite strict: the computer software indicated the household members eligible for the interview. To avoid measurement errors, a profound preparation and development of the questionnaire took place.[71] In several phases, question wording, length of the questionnaire, comprehensibility of the questions, etc. was tested. Further, answer cards were used to avoid memory effects and to ease the answering process. Errors in the data processing were minimised via the use of CAPI. Only the paper and pencil questionnaires were entered into the computer by hand after the interview (Das et al., 2005).

Third, several mechanisms were built into SHARE to limit non-observation errors, and more specific to reduce the influence of non-response errors. The contact procedure included a number of specific techniques to stimulate respondents to participate and to improve the response rate. For example, a minimum number of contact attempts had to be done, and interviewers were trained in participation enhancing strategies and refusal

[70] Also sample size is said to be important to avoid sampling errors. On the one hand, very large samples are time and money consuming, and do not contribute to a higher level of precision. On the other hand, very small samples do not provide the wanted level of precision, and thus threaten the quality of the survey results (Bethlehem, 2009).

[71] For more information on the development of the survey instrument, consult Börsch-Supan and Kemperman (2005).

conversion mechanisms (De Luca & Lipps, 2005). Nevertheless, as already mentioned, the Belgian SHARE is prone to a substantial degree of non-response (about 65%, cf. supra). Weighting could be a valuable strategy to deal with the undercoverage (or overcoverage) of certain groups in the sample, and to increase to representativeness of the research results. This is discussed in the next section.

Finally, to minimise item non-response (i.e. respondents not willing to answer specific questions, which leads to gaps in the questionnaires) in questions on amounts of income, assets, etc., an unfolding bracket procedure was incorporated in the questionnaire. In addition, imputed values are calculated by the central SHARE research team to compensate for item non-response. This is discussed more in detail in section 3.4.3.

3.4.2 Dealing with undercoverage: the (non)sense of weighting

Different mechanisms had to maximise the respondents' willingness to participate in SHARE (cf. supra). Yet, the Belgian SHARE still faces relatively high levels of non-response: for the first wave we estimated that only 36% of the initial sample of individuals was actually interviewed (see 3.2.3). When the non-responding part of the sample is different from the responding part, this can lead to non-response bias with important consequences for the research results (Bethlehem & Schouten, 2004).

To discover non-response bias, we should compare the responding and non-responding part of the sample with the entire sample to assess the difference between both. Yet, in the SHARE this is not possible because there is no information available on the non-responding part of the sample. We can, however, compare the realised sample with the entire population on a number of basic characteristics to determine whether the realised sample resembles the target population. As show in Table 6.4, men, individuals aged 60 to 64 years, elderly living in Brussels, and elderly living with partner are (slightly) under covered in the realised sample. Women, those aged 70 years and more, elderly living in Flanders and Wallonia, and single elderly are (somewhat) overrepresented in the realised sample.

Table 6.4. Comparison of the realised sample (unweighted) and the population aged 60 and over by sex, age, region of residence and living situation (2007)

	Realised sample		Population	
	N	%	N	%
Sex				
Male	699	41	1019412	45
Female	993	59	1271392	55
Age				
60-64	359	21	581890	25
65-69	344	20	452719	20
70-74	339	20	439152	19
75-79	300	18	389350	17
80+	350	21	427693	19
Region				
Flanders	1068	63	1394017	61
Wallonia	558	33	704922	31
Brussels	66	4	191865	8
Living situation				
Single	612	36	800789	35
Couple	1080	64	1490015	65
Total	**1692**	**100**	**2290804**	**100**

Note: The population totals are adjusted for individuals living in one of the seven German speaking municipalities, and individuals permanently living in a residential care facility (i.e. registered as being part of a collective household in the National Register).

Source: Author's calculations on SHARE data wave 2 (for the realised sample) and Kruispuntbank Sociale Zekerheid (2014) (for the population)

Finding differences between the realised sample and the entire population is one thing, adjusting for them another. To correct for the potential bias from the under- and overcoverage of certain groups in the sample, correction techniques can be used. Poststratification is one of these techniques (Gelman & Carlin, 2002). To successfully improve the representativeness of the research results, the weighting variables should be related to the main variables of interest (Bethlehem & Schouten, 2004). For our research, this implies that the weighting variables have to be related to the old age income and care package. From the 2010 Belgian Pension Atlas (Berghman et al., 2010), we know that old age income is related to sex and age, mainly favouring men and younger pensioners. Also, we know that age differences exist in the use of health and social care services (cf. supra). It thus makes sense to use sex and age as weighting variables to match the realised sample to the research population.

Before calculating the poststratification weights, account should be given to differences in the selection probabilities stemming from the sample design (see 3.2.2). The design weights are calculated by the SHARE research team as "the inverse of the probability of being included in the [...] sample." (De Luca & Rossetti, 2010, p. 23). The poststratification weights on their turn are computed taking account of the population distribution and the sample distribution by age and sex. Information on the population distribution is based on the Belgian National Register (Algemene Directie Statistiek en Economische Informatie,

2009). Following Bethlehem (2002), the poststratification weights are calculated per stratum of age and sex as:

$$weight_{PS} = \frac{N_h}{n_h} x \frac{n}{N}$$

in which N_h refers to the size of the stratum in the population, n_h refers to the size of the stratum in the sample, N to the total population size and n to the total sample size. We combine the design weights with the poststratification weights to adjust the realised sample to the research population. In a final step, the weights are rescaled to facilitate the interpretation of the research results.[72]

When applying weights, one must be aware of the fact that weights do not only improve the representativeness of the research results and reduce the non-response bias, they also can increase the standard error and the variance in the variables, which reduces the reliability of the research results (Bethlehem, 2002; Gelman & Carlin, 2002). This has to be kept in mind when interpreting the research results. In the sensitivity analysis (cf. infra), we will examine more in detail the effect of weights on the research results.

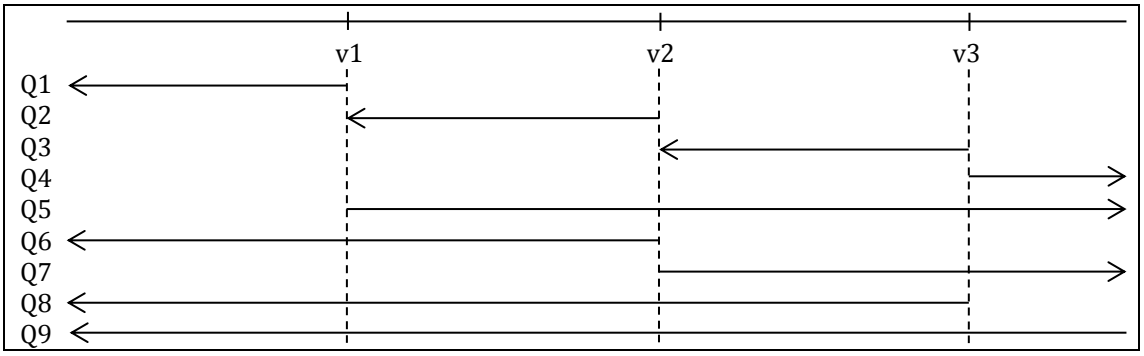
3.4.3 Dealing with item non-response

Errors are very likely to occur in income questions, since they are generally considered as very sensitive for non-response: respondents often do not know the exact amount asked, or they are not willing to provide this information. In the SHARE, a specific procedure – the unfolding bracket procedure – was included to minimise item non-response on income questions (Christelis, 2011). When the respondent did not give the exact amount, a set of subsequent questions was posed to estimate that amount. The respondent had to answer whether the amount was larger, smaller or about the same as a given amount. The number of questions depended on the entry point value (v1, v2, v3).[73] The sequence of questions is illustrated in Figure 6.4.

[72] More details on the calculation of the weights are provided in the appendix.

[73] To illustrate: if the respondent does not know the level of his monthly pension, the interviewer asks whether this amount is larger than, smaller than or about 1000 Euros (v2). If the respondent answers that the pension is larger than 1000 Euros, the interviewer asks whether the amount is larger than, smaller than, or about 1.500 Euros (v3). If the respondent than answer that the pension is smaller than 1500 Euros, we know that the amount is between 1000 and 1500 Euros.

Figure 6.4. Illustration of the unfolding bracket procedure



Source: Brugiavini et al. (2005, p. 108)

After completion of the unfolding brackets procedure, the interviewer had a fairly correct, though not exact, idea about the real amount (Das et al., 2005). Yet, the use of unfolding bracket answers is not completely error-free: entry point bias (i.e. answers within unfolding brackets questions are biased towards the entry point) may occur, though this is not expected to be an important source of error (Juster, Cao, Perry, & Couper, 2006).

An analysis of a selection of income variables on employment and pensions, housing and assets showed that the use of unfolding brackets improves the average response rate from about 58% before the unfolding brackets to about 76% after the unfolding brackets (see Table 6.5). Even after the unfolding bracket procedure, item non-response remained larger in the module on assets than in the modules on employment and pensions and housing.

Table 6.5. Average item response rate on selected income variables, before and after unfolding brackets, SHARE wave 2 (%)

	Before unfolding brackets Response rate (%)	After unfolding brackets Response rate (%)
Module		
Employment and pensions	90	95
Assets	36	61
Housing	79	95
Overall average response rate	**58**	**76**

Note: The following items were used from the module on employment and pensions: ep078e1-ep078e16, ep082e1-ep082e16; from the module on assets: as003, as005, as007, as009, as011, as015, as017, as058; and from the module on housing: ho024, ho027 and ho030.

Source: Authors' calculations based on SHARE data wave 2

Although the use of the unfolding bracket procedure reduces the item non-response on certain income questions, still important amounts of non-response are found. Several options are available to limit even more the negative effects of item non-response: list wise or pair wise deletion of respondents with missing values on income questions, single and multiple imputation of missing values, etc. (cf. Allison, 2002; Bethlehem, 2009). The central SHARE research team provides imputed values based on the multiple imputation

procedure of Rubin (1987, in Allison, 2002).[74] Multiple imputation was preferred over single imputation because of the fear that a single imputation dataset would be used in the same manner as a dataset without imputations, and thus "the uncertainty due to the imputation of missing values would not be captured by the estimates generated from the single completed dataset, thus leading to potentially severely underestimated standard errors." (Christelis, 2011, p. 6). The imputation methodology was based on the Fully Conditional Specification Method (FCS) of van Buuren, Brand, Groothuis-Oudshoorn and Rubin (2006, in Christelis, 2011), which assumes information to be missing at random (MAR). According to Christelis (2011, p. 10) the MAR assumption "is made in the vast majority of imputation procedures applied to large household surveys", although it is likely that this does not hold for all variables. Even if this is the case, the FCS method combined with multiple imputation is said to "perform reasonable well, (…) [to] lead to less biased estimates than an analysis that uses only observations without missing data (…) [and to be] a reasonably robust procedure.". The following decisions were made in the imputation procedure by the central SHARE research team (Christelis, 2008):

1. Imputations were done separately for each country in SHARE;
2. The sequence of introducing variables into the imputation model depended on the number of missing values and their predictive power: demographic variables were included before economic variables; individual-level variables before household-level variables; and important variables before less important variables;
3. The logical order of the variables was respected when introducing them into the imputation model. For example, pension ownership was determined before calculating the imputations.
4. The amount information in the unfolding brackets procedure was used to calculate the imputations.
5. Five imputation datasets were generated, following Rubin's advice on the number of imputations, resulting in five imputed values for each missing one.

The exact use of imputed values in our research is discussed in chapter 7 when the operationalisation of the old age income package is considered. The influence of the imputations on the research results is investigated as part of the sensitivity analysis (cf. Appendix 3).

4. Sensitivity analysis

Working with survey data always implies a certain degree of uncertainty whether or not the research results, which are based on a sample of the population, reflect the actual situation of the entire population. This stems from, among others, the sampling procedure,

[74] For a detailed overview of the imputed variables, see SHARE Project (2010, pp. A38–A44). More details on the imputation procedure are provided by Christelis (2011).

differences between the sample and the population, the use of weights and imputations, the operationalisation of the concepts, etc.

To a certain extent, sensitivity analysis is an appropriate technique to reduce the uncertainty in the research results. Sensitivity analysis refers to an alternative analysis of the data with changes in the model parameters and/or the model assumptions to check the robustness of the research results. If the changes have little influence on the research results, the model is concluded to be quite robust and not very sensitive to changes in the model parameters and assumptions. In that case the research results are considered to be (quite) reliable. However, if the changes in the model parameters and/or assumptions have an important influence on the research results, the robustness and the validity of the model and the research results can be questioned. More details on the sensitivity analysis are presented in the methodological appendix (Appendix 3). We will focus on the influence of weights, imputed values, and equivalence scales on the main research results.

5. Conclusion

In this chapter, the research design, the data and the main characteristics of the research population were discussed. Different reasons were put forward to motivate our quantitative, cross-sectional single-country study based on secondary survey data. An overview of potential data sources, including survey data and administrative data, was used to motivate our choice to work with SHARE data. This survey focuses on the elderly population and on different aspects of the ageing process (like income and care use); it thus is most appropriate to answer our research questions. The main characteristics of the SHARE were discussed, with specific attention for the target population, the sample design and the realised sample. We focused on the quality of the data (collection); weights and imputations were put forward to tackle issues of bias related to unit and item non-response. The importance of a sensitivity analysis was highlighted: it contributes to a validation of the research results, it reduces uncertainty due to data manipulations, and it improves the reliability of the research results.

In the next chapters, the operationalisation and the main research results are discussed. In chapter 7, we focus on the operationalisation of the old age income package. We distinguish the personal income package, including income sources with personal entitlement like pensions, and the extended income package, that includes personal income sources as well as asset sources like financial assets and property ownership. In chapter 8, we analyse the personal and extended old age income package of the Belgian elderly population. We pay particular attention to the relationship between the personal and the extended income package and the quality of the financial protection provided by the old age income package. In addition, we investigate whether certain background characteristics, like sex, age and socioeconomic status, are related to the old age income package. In chapters 9 and 10 we focus on the old age care package, that includes the health and social care services that are used by the elderly population. In chapter 9, the

operationalisation of the care package is discussed, while in chapter 10 we focus on the research results. Attention is paid to the composition of the care package, the intensity of the use of care services, and the quality of the protection provided against the functional dimension of old age dependency. We pay particular attention to the relationship between the old age income package and the old age care package, to investigate whether inequalities in the old age income package are reproduced into the old age care package.

CHAPTER 7

OPERATIONALISATION OF THE OLD AGE INCOME PACKAGE

CHAPTER 7. OPERATIONALISATION OF THE OLD AGE INCOME PACKAGE

In this chapter, we discuss the operationalisation of one of the main concepts in our research: the old age income package,. The operational concept should include the different income sources available to the elderly population. Because we use SHARE data, we are limited to the income sources that are included in the SHARE. On the one hand, the income package includes income sources with personal entitlement, like pensions and wages. This is referred to as the personal income package, composed of personal income sources. On the other hand, also assets, like financial assets and property ownership, are at the disposal of the elderly population. This is referred to as asset sources, or the asset package. When the personal income sources and the asset sources are taken together, we speak of the extended old age income package. A difference is always made between the ownership and the level of protection provided by the different income sources.

In the first section, we address the operationalisation of the personal income package, which includes only personal income sources. We investigate the existence of clusters of personal income sources using a hierarchical cluster analysis. In section 2, the asset sources shared within households are discussed. This includes financial assets and property ownership. We simulate the potential contribution from these assets to the income of the elderly population. In the third section, the equivalence scale used to take account of financial solidarity within households, is discussed. In the last section, we present the indicators that are used to evaluate the level of protection that is provided by the old age income package against the financial dimension of old age dependency.

1. Income sources with personal ownership

Income sources with personal ownership refer to the income sources that are paid to a person, based on his or her individual situation, and that - overall - are immediately available for consumption. This includes pensions, social security benefits, wages, etc. We distinguish between income source ownership (whether one has received a specific income source) and the generosity of these sources (income level).

1.1 Assessing personal income source ownership

For the older population, the main income sources with personal ownership are the different types of pensions. The SHARE module on employment and pensions contains information on the ownership of first pillar pensions (items 1, 2, 3, 7, 8, 9), social security

benefits (items 4, 5, 6), and the public care insurance (item 10). The respondents are asked which income sources they have received in the last year, and they can give more than one answer if necessary.

ep071 Have you received income from any of these sources in the previous year? *(multiple answers possible)*
1. Public old age pension
2. Public old age supplementary pension or public old age second pension
3. Public early retirement or pre-retirement pension
4. Main public disability insurance pension, or sickness benefits
5. Secondary public disability insurance pension, or sickness benefits
6. Public unemployment benefit or insurance
7. Main public survivor pension from your spouse or partner
8. Secondary public survivor pension from your spouse or partner
9. Public war pension
10. Public long-term care insurance
96. None of these

To assess second and third pillar pension ownership, the module on employment and pensions includes two additional questions: ep324 for second pillar pensions and ep089 for third pillar pensions (item 1,2). Ep089 also allows us to determine whether the respondent has received other regular private payments, like alimony and private (long-term) care insurance payments

ep324 Have you received income from any of these sources in the previous year? *(multiple answers possible)*
1. Occupational old age pension from your last job
2. Occupational old age pension from a second job
3. Occupational old age pension from a third job
4. Occupational early retirement pension
5. Occupational disability or invalidity insurance
6. Occupational survivor pension from your spouse or partner's job
96. None of these

ep089 Did you receive any of the following regular payments or transfers during the previous year? *(multiple answers possible)*
1. Regular life insurance payments
2. Regular private annuity or private personal pension payments
3. Alimony
4. Regular payments from charities
5. Long-term care insurance payments from a private insurance company
96. None of these

The main disadvantage of the questions on the second and third pillar pension ownership is that these questions focus only on the receipt of pension payments in the previous year. We know, however, that an important part of second and third pillar pension payments is paid as single lump sums (cf. chapter 3). Registering only the receipt of second and third pillar pensions received in the last year leaves out an important group of people who have received second and third pillar pension payments in the years before. For example, a respondent who is retired for a period of 15 years and received a lump sum occupational pension at the moment he/she retired will not be captured in the preceding questions.

However, to give in to this shortcoming, additional information on second (re025, item 2) and third pillar pension ownership (re025 item 3 and fs006) in the past was looked up in the retrospective life history survey of SHARELIFE. Note that the SHARELIFE asks whether the respondent contributed to the built-up of second and third pillar pensions. We assume that the built-up of an additional pension always results in a payment at a certain point in time.

re025 While doing this job, towards which of the following did you or your employer contribute? *(multiple answers possible)*
1. A public pension plan
2. An occupational pension plan
3. A private pension plan or individual retirement plan
4. No contributions paid

fs006 Have you ever subscribed to an individual retirement account?
1. Yes
5. No

Including the retrospective information on the receipt of second and third pillar pensions increased importantly the second and third pillar pension ownership within the research population. Table 7.1 shows the distribution of the research population by second and third pillar ownership in the previous year (based on SHARE) and having contributed to the built-up of second and third pillar pensions before retirement (based on SHARELIFE). Based on the information in the SHARE, resp. 5% and 1% of the research population received a second or third pillar pension, while in the SHARELIFE resp. 6% and 46% of the respondents indicated to have contributed to the built-up of a second or a third pillar pension before retirement.

Table 7.1. Including retrospective information on the receipt of second and third pillar pensions (unweighted, 2007)

	Received in previous year (ep324/ep089)			Contributions paid before retirement (re025/fs006)			Combined		
	Yes (%)	No (%)	Total (N)	Yes (%)	No (%)	Total (N)	Yes (%)	No (%)	Total (N)
Second pillar pension	5	95	1687	6	94	1687	11	89	1687
Third pillar pension	1	99	1689	46	54	1689	48	52	1689

Source: Author's calculations based on SHARE data wave 2

Lastly, a minority of our respondents is still active on the labour market and thus receives an income from (self-)employment. To include these income sources, the following questions were used from the module on employment and pensions:

ep204 Have you had any wages, salaries, or other earnings from dependent employment in the previous year?
1. Yes
5. No

ep206 Have you had any income at all from self-employment or work for a family business in the previous year?
1. Yes
5. No

We constructed a number of ownership variables, based on the information in the preceding questions. We distinguish between first pillar pensions, second pillar pensions, third pillar pensions, social security benefits, wages (either from employment or self-employment), private payments and long-term care insurance payments (either from public or private providers). Table 7.2 gives for each personal income source the proportion of the research population that has received this income source. The majority of the research population receives a first pillar pension (76%). Second and third pillar pensions are less widespread: resp. 11% and 49% of the research population receives or has received this type of pension. The other personal income sources are less important. Only 7% receives a social security benefit, which is obvious because the entitlement to social security benefits ends at the age of 65. Given the low importance of labour market participation, only 6% of the research population has an income from employment or self-employment. Less than 1% of the research population receives long-term care insurance payments or private payments.

Table 7.2. Personal income sources ownership of the research population (unweighted, 2007)

		Ownership			
Personal income source	**Based on …**	**Yes (%)**	**No (%)**	**Total (N)**	**N missing**
First pillar pension	ep071 (items 1, 2, 3, 7, 8, 9)	76	24	1689	3
Second pillar pension	ep324 / re025 (item 2)	11	89	1687	5
Third pillar pension	ep089 (item 1,2) / re025 (item 3) / fs006	49	51	1691	1
Social security benefit	ep071 (items 4, 5, 6)	7	93	1689	3
Long-term care insurance	ep071 (item 10) / ep089 (item 5)	1	99	1690	2
Wage	ep204 / ep206	6	94	1689	3
Private payments	ep089 (items 3,4)	1	99	1688	4

Source: Author's calculations based on SHARE data wave 2

1.2 Defining clusters of personal income sources via hierarchical cluster analysis

After having determined the ownership of the different income sources, a hierarchical cluster analysis was performed to differentiate clusters of personal income sources. Hierarchical cluster analysis is an explorative technique that combines observations into groups or clusters so that there is a large degree of in-group homogeneity and out-group heterogeneity. The number of clusters is not know in advance, and the grouping in clusters depends on the distance between the clusters. The main advantage of cluster analysis is

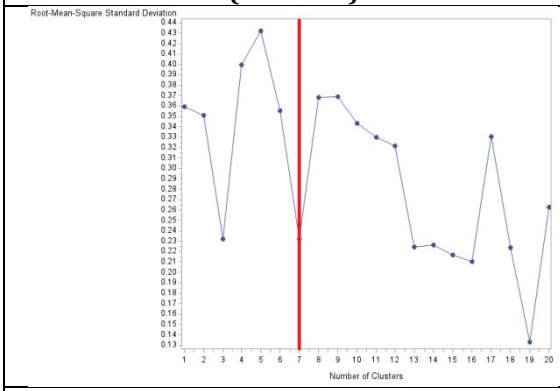
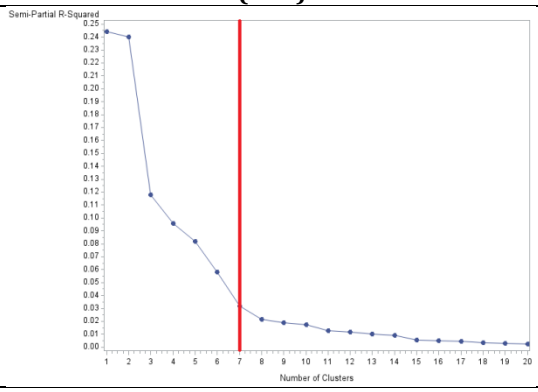
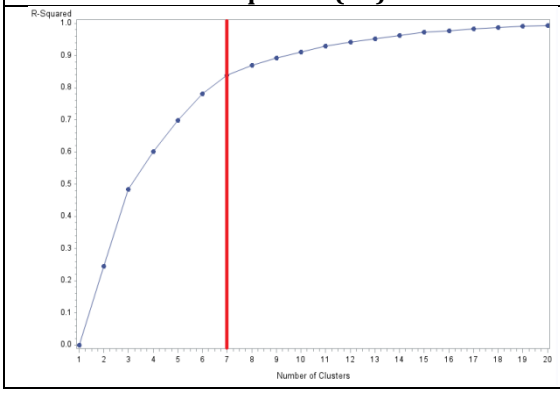
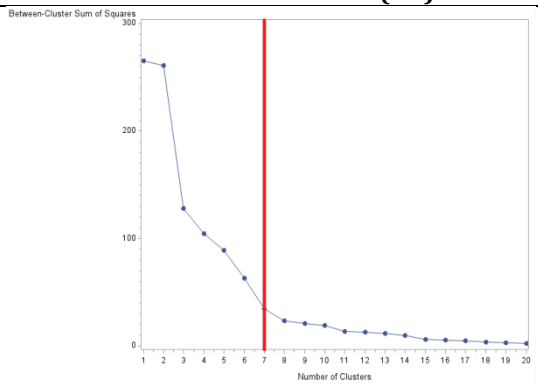
that the clusters are derived from the data, independent of the researcher and his/her predispositions. In this way, we are guided by the data and not by our expectations. Obviously, the cluster solution will be investigated and validated in detail afterwards, to strengthen and enforce the cluster solution.

Different techniques can be used to determine the distance between the clusters and the final number of clusters, like the centroid method, the single-linkage method, the average-linkage method and the Ward's method. For our analyses, the Ward's technique was used to create clusters maximizing the within-cluster homogeneity and minimizing the within-cluster sum of squares. According to the overview of Sharma (1996) the Ward's technique most often gives the best results.

The cluster analysis was performed in SAS, using the PROC CLUSTER procedure. The input variables were the variables on the ownership of the most important personal income sources, namely first, second, and third pillar pensions, social security benefits and wages. Private payments and long-term care insurance payments were not included in the cluster analysis because they are owned by less than 1% of the research population. Only observations without missings on all included income sources were used for the cluster analysis; 6 observations were excluded because of missings.

The most appropriate number of clusters always depends on the interpretation of the researcher. Yet, specific statistics can be used to evaluate of the cluster solution and to make an informed decision on the number of clusters. In SAS, the root-mean-square standard deviation (RMS STD), the semipartial R-squared (SPR), the R-squared (RS) and the inter-cluster distance (CD) are calculated and plotted (see Table 7.3). According to Sharma (1996) the RMS STD, that measures the homogeneity of the new cluster, as well as the RMS and the CD, indicating the homogeneity of the merged clusters, should be low. The RS, which measures the heterogeneity of the clusters, should be high.

Table 7.3. Overview of the hierarchical cluster analysis statistics to decide on the number of income clusters

Root-mean-square standard deviation (RMS STD)	Semi-partial R-squared (SPR)
	
R-squared (RS)	**Inter-cluster distance (CD)**
	

Based on the results of the Ward's hierarchical cluster analysis, it was decided that the seven cluster solution fits the data best. The RMS STD is low when compared to the solutions with less of more clusters. Both the SPR and the CD start to rise fast after the seven cluster solution, and the RS decreases importantly when less than seven clusters are involved.[75]

In a next step, the cluster membership was assigned to each respondent via the PROC TREE procedure. Afterwards, we are able to determine the income sources that are most important in each cluster. Table 7.4 gives an overview of the personal income source ownership in each cluster. Clusters 1, 2, 3 and 4 are "exclusive" clusters: all observations in those clusters have the same personal income sources. In cluster 1, all observations have

[75] Note that it is advised that a hierarchical cluster analysis is complemented with a non-hierarchical cluster analysis to validate the number of clusters. However, according to Wijnen, Janssens, De Pelsmacker, and Van Kenhove (2002) non-hierarchical cluster analysis is not a valid technique to use with exclusively binary variables, as is the case here.

first pillar pensions, in cluster 2 all observations have third pillar pensions, in cluster 3 all observations combine first and third pillar pensions, and in cluster 4 all observations have no personal income sources. Clusters 5, 6 and 7 are not exclusive clusters, but it is possible to determine the most important income sources in each cluster. In cluster 5, all observations have a second pillar pension, and nearly all observations have a first pillar pension (98%). A smaller group in cluster 5 also has a third pillar pension (63%). In cluster 6, all observations receive a social security benefit, sometimes in combination with a first (41%), a second (14%) or a third pillar pension (58%). A minority in cluster 6 combines a wage with social security benefits (7%). The last cluster is dominated by wage ownership: 96% of the observations receives a wage. Again a part of the observations in this group combines his/her wage with a first (50%), a second (20%), a third pillar pensions (70%) or with a social security benefit (1%).

Table 7.4 also shows the distribution of the research population to these clusters of personal income sources. The first (first pillar pensions) and the third (first and third pillar pensions) cluster are the most important clusters. About 62% of the research population is in these clusters (resp. 34% in the first and 28% in the third cluster). About 11% of the research population has no personal income sources (cluster 4). The remaining 27% of the research population belongs to the other clusters: 6% has only a third pillar pension (cluster 2); 9% has a first and second pillar pension, either or not in combination with a third pillar pension (cluster 5); 7% receives social a security benefit in combination with other income sources (cluster 6); and 5% of the research population receives a wage in combination with other income sources (cluster 7).

Table 7.4. Relative distribution of the research population by cluster and personal income source ownership (unweighted, 2007)

Cluster	Total		% personal income source ownership				
	N	%	First pillar	Second pillar	Third pillar	Wage	SS benefit
1	569	34	**100**	0	0	0	0
2	107	6	0	0	**100**	0	0
3	477	28	**100**	0	**100**	0	0
4	183	11	0	0	0	0	0
5	147	9	**98**	**100**	63	0	1
6	113	7	41	14	58	7	**100**
7	90	5	50	20	70	**96**	1
Total	1686	100					

Note: 6 respondents were excluded from the cluster analysis because they had missings on at least one of the personal income sources included in the analysis.

Source: Author's calculations based on SHARE data wave 2

To recapitulate, the hierarchical cluster analysis resulted in the following clusters of personal income sources (see also Table 7.4):

- cluster 1: only a first pillar pension (P1);
- cluster 2: only a third pillar pension (only P3);
- cluster 3: a first and a third pillar pension (P1+P3);

- cluster 4: no personal income sources (None);
- cluster 5: a second and a first pillar pension (combined with a third pillar pension) (P2+P1);
- cluster 6: a social security benefit, combined with other income sources (SS+other); and
- cluster 7: a wage from (self-)employment, combined with other income sources (Wage+other).

1.3 Assessing the income package generosity

After assigning each respondent with the appropriate income package based on the hierarchical cluster analysis, the generosity of the personal income packages was calculated. In doing so, information on payments was drawn from the SHARE module on employment and pensions. This information includes the period and the level of payment. The following questions were used to determine the income from first and second pillar pensions and from social security benefits:

ep078e After taxes, about how large was a typical payment of this income source in the previous year?
[Numerical value]

ep074 What period did that payment cover?
1. One week
2. Two weeks
3. Calendar month (4 weeks)
4. Three months (13 weeks)
5. Six months (26 weeks)
6. Full year (12 months)
97. Other

An exploratory analysis showed that 2% of the research population (29 respondents) reported an extremely high first pillar pension. Based on theoretical considerations regarding maximum first pillar pensions in 2007[76], first pillar pensions over 5000 Euros per month were considered as errors. These respondents were left out of the final analyses.

For third pillar pensions, the following two questions were used:

ep094 After any taxes and contributions, about how large was the average payment of this income source in the previous year?
[Numerical value]

[76] In 2007, the maximum gross retirement pension for employees was about 2050 Euros per month. For self-employed pensioners, the maximum gross retirement pension was about 1170 Euros per month (Put, 2007). Retired statutory civil servants were eligible to an absolute maximum gross retirement pension of 3906 Euros per month (Appels, Franceus, Van Sande, & De Becker, 2007).

ep090 Which period did that payment cover?
1. One week
2. Two weeks
3. Calendar month (4 weeks)
4. Three months (13 weeks)
5. Six months (26 weeks)
6. Full year (12 months)
97. Other

As often is the case with income questions, non-response threatens the quality of the data (cf. chapter 6). To minimise non-response in the data, imputations calculated by the SHARE research team are used. Imputed values were only used when the respondent indicated ownership of that income source; income source ownership itself was not imputed. For example, for first pillar pension, amounts were imputed for 15% of the respondents with first pillar pension ownership. Imputations become more important when second and third pillar pensions are considered (resp. 23% and 40%) (see Table 7.5). One must keep in mind that the use of imputations can have consequences for the research results. Therefore, we investigate the influence of the imputations on the overall research results in the sensitivity analysis (Appendix 3). In addition, we also compare the population with and without imputed values on the income variables on a number of background characteristics (e.g. sex, age, region of residence, etc.) (Appendix 4).

Table 7.5. Relative distribution of the research population according to imputations for first, second and third pillar pensions (unweighted, 2007)

	No imputations (%)	Imputations (%)	Total (N)
First pillar pensions	85	15	1353
Second pillar pensions	77	23	80
Third pillar pensions	60	40	20

Source: Author's calculations based on SHARE data wave 2

Further, an additional problem came fore with the second and third pillar pensions. We retrieved information on the receipt of second and third pillar pensions in the past from SHARELIFE (cf. supra), but SHARELIFE does not collect information on the level of the second and third pillar pensions received in the past. The only information on the level of second and third pillar pensions is included in SHARE. For this payment information, we assume that it refers to regular pension payments (for example, monthly or annual payments) and not to single lump sum payments. However, this also implies that no information is available on the level of second and third pillar pension that were paid as lump sum payments in the past, for which we determined the ownership via the SHARELIFE. Yet, because we focus on the disposable income and because we include assets in the extended income package, the lump sum payments received in the past are accounted to some extent. After all, single lump sum payments received in the past that have been spent, no longer contribute to the actual disposable income. When these lump sums have been saved or invested in property, their contribution is accounted via the

inclusion of assets in the extended income package (cf. infra). However, this approach still does not allow us to get a complete picture of the financial importance of second and third pillar pensions, because we are not able to make a difference between the assets from second and third pillar pensions (paid a single lump sums) and the assets that have been accumulated during the active life phase. This should be taken into account when interpreting the research results.

Besides income from first, second and third pillar pensions and social security benefits, also the income from (self)employment determines the generosity of the income package. The following SHARE questions collect information on the wage from (self)employment:

ep205 After any taxes and contributions, what was your approximate income from employment in the previous year?
[Numerical value]

ep207 After any taxes and contributions and after paying for any materials, equipment or goods that you use in your work, what was your approximate income from self-employment in the previous year?
[Numerical value]

Similar to the pension income, amounts were calculated on a monthly basis and imputed values were used whenever necessary. This was the case for 27% of the respondents with wage ownership.

Further, also regular private payments and long-term care insurance payments (either from a public or a private provider) are used to determine the generosity of the income package. For this, the following SHARE questions were used:

ep094 After any taxes and contributions, about how large was the average payment of this income source in the previous year?
[Numerical value]

ep090 Which period did that payment cover?
1. One week
2. Two weeks
3. Calendar month (4 weeks)
4. Three months (13 weeks)
5. Six months (26 weeks)
6. Full year (12 months)
97. Other

Again, imputed values were used if necessary. This was the case for one respondent who received private payments, and for one respondent who received long-term care insurance payments.

The amounts of the different income sources were combined into a single amount variable: the monthly income from the old age income package of personal income sources after taxes and contributions (i.e. the monthly net income from the personal income package). Respondents without personal income sources were assigned with a monthly income of zero Euros. Amounts were only calculated when the respondent indicated

having received these income sources. In case ownership information was missing, the level of income package was also set to be missing.

2. Income sources shared within the household

In the previous section attention was paid to personal income sources. In this section, we focus on the sources that are built-up and shared within the household[77], and that are assumed not to be owned by only one household member. This refers to the assets accumulated within the household, being financial assets and property ownership. We discuss both asset ownership (2.2.1) and the contribution from these assets to the extended old age income package (2.2.2).

2.1 Financial assets and property ownership

Within the SHARE, information on assets is registered at the household level, but for our research the household information is appointed to each household member at the individual level. Assets ownership thus refers to assets ownership within the household.

Financial assets include for example bank accounts, stocks and bonds, that contribute both directly, via interests, and indirectly, in that they are a buffer against potential financial shocks, to the old age income package. In the SHARE, the following questions in the module on assets focus to the household ownership of financial assets:

as060 Do you (or your partner) currently have any money in bank accounts, transaction accounts, saving accounts or postal accounts?
1. Yes
5. No

as062 Do you (or your partner) currently have any money in government or corporate bonds?
1. Yes
5. No

as063 Do you (or your partner) currently have any money in stocks or shares (listed or unlisted on stock market)?
1. Yes
5. No

[77] Also personal income sources are expected to be shared within the household; that is why equivalent incomes are calculated (cf. infra). However, the difference we make is between sources with personal entitlement (like pensions and wages) and sources with broader household entitlement (like assets).

as064 Do you (or your partner) currently have any money in mutual funds or managed investments accounts?
1. Yes
5. No

Table 7.6 shows the distribution of the research population by financial asset ownership. The vast majority of the research population has access to savings in a bank account (97%). Other financial asset sources are less important: only 13% has bonds, 22% has stocks and 15% of the research population has savings in mutual funds or managed investment accounts. Also note that the non-response ranges between 2% and 6%.

Table 7.6. Financial assets sources ownership of the research population (unweighted, 2007)

	Ownership			
Financial assets	**Yes (%)**	**No (%)**	**Total (N)**	**N missing**
Bank account	97	3	1647	40
Bonds	13	87	1584	103
Stocks	22	78	1587	100
Mutual funds	15	85	1581	106

Source: Author's calculations based on SHARE data wave 2

Besides financial assets also property ownership is included. Property ownership contributes mainly indirectly to the income package. In case of home ownership, no additional costs for renting have to be made, thus providing a buffer against poverty. A direct contribution from property ownership comes from the potential to renting out the property: the rent is immediately available to the household. Also, the property can be sold in times of need to provide an additional income (cf. chapter 3). The SHARE registers property ownership at household level with the following questions in the housing module:

ho002 Do you live as an owner, a main tenant, a subtenant, or do you live rent free? *(single answer)*
1. Owner
2. Member of a cooperative
3. Tenant
4. Subtenant
5. Rent free

ho026 Not including special time-sharing arrangements, do you (or your partner) own secondary homes, holiday homes, other real estate, land or forestry?
1. Yes
5. No

ho029 Did you or your partner receive any income or rent from these properties in the previous year?
1. Yes
5. No

A difference is made between home ownership (ho002, item 1) and secondary residence ownership (ho026). Home ownership refers to the house one owns and lives in, while secondary residence refers to other property one owns and does not live in. Being member of a housing cooperative (ho002, item 2) is considered as home ownership, but this holds for only one respondent. Although respondents that live rent free do not have rental costs like home owners, they cannot sell their house in times of financial hardship. Consequently, this is not considered as home ownership.

Table 7.7 shows the unweighted distribution of the research population by property ownership. The majority of the research population owns a house for living (80%). About 17% owns secondary residence, of this group almost half receives rent from this secondary residence. Information on property ownership was missing for about 2% of the research population.

Table 7.7. Property ownership of the research population (unweighted, 2007)

	Ownership			
Property assets	**Yes (%)**	**No (%)**	**Total (N)**	**N missing**
Home ownership	80	20	1649	38
Secondary residence	17	83	1649	38
Rent	8	92	1649	38

Source: Author's calculations based on SHARE data wave 2

2.2 The contribution from assets

To assess the contribution from financial and property assets in the old age income package, different strategies can be used. We make a distinction between the (potential) contribution from financial assets and secondary residence (section 2.2.1) and the (potential) contribution from home ownership (section 2.2.2). In the last paragraph we formulate some critical remarks on the methodology used.

2.2.1 The (potential) contribution from financial assets and secondary residence

First, the direct contribution can be assessed in that financial assets generate interests and secondary residence can yield rental incomes. Such information is included in the SHARE modules on assets and housing:

as005 After taxes, about how much interest income did you (and your partner) receive from such [bank] accounts in the previous year?
[Numerical value]

as009 After taxes, about how much interest income did you (and your partner) receive from the bonds in the previous year?
[Numerical value]

as012 After taxes, about how much dividend income did you (and your partner) receive from these stocks in the previous year?
[Numerical value]

as019 After taxes, about how much interest or dividend income did you (and your partner) earn with mutual funds or managed investment accounts in the previous year?
[Numerical value]

ho030 How much income or rent did you or your partner receive from these properties during the last year, after taxes?
[Numerical value]

Secondly, inspired by Weisbrod and Hansen (1968), the wealth stock in financial assets and secondary residence can be transposed to a fictitious annuity (A_n) to simulate the potential contribution to the disposable income. For financial assets, we assume that the assets stock is spent gradually over the remaining life course. For secondary residence ownership, we assume that the property is sold and that the proceeds are spend gradually over the remaining life course. In calculating the simulated income from financial assets and secondary residence, account is given to the accumulated wealth (NW_t) that combines the wealth in financial assets and the value of the secondary residence, the remaining life expectancy (E_x) (i.e. the predicted period to spend the asset stock) and the long-term interest rate (r).[78] The annual fictitious annuity from financial assets and secondary residence ownership is thus calculated as:

$$A_n = NW_t * \frac{r}{1-(1+r)^{-E_x}}$$

The disposable income at a moment t (Y_t*) is the sum of the actual available income from the personal income package (Y_t) and the fictitious annuity from assets:

$$Y_t^* = Y_t + A_n$$

The long-term interest rate r was set at 4.33% (based on the interest rate of an OLO reference loan with a duration of 10 years at the secondary market, provided by the National Bank of Belgium (2012) in its annual macro-economic statistics).

To determine the remaining life expectancy E_x, a difference is made between singles and couples. For singles, sex specific life tables[79], provided by Statistics Belgium (Algemene Directie Statistiek en Economische Informatie, 2013), are used. The remaining life expectancy is based on the current age and sex of the respondent. For couples, different strategies can be used. A first strategy assumes that the annuity is paid only as long as both partners are alive. The remaining life expectancy in that case refers to the partner

[78] As similar approach was used in a research project on the adequacy of the Belgian pension system for pensioner households (cf. Berghman, Curvers, Palmans, & Peeters, 2007; Berghman, Curvers, Palmans, Vandermeerschen, & Verpoorten, 2009).
[79] These life tables are based on the age at last birthday. They do not take account of future evolutions in life expectancy.

with the shortest predicted life span. However, we doubt that couples would choose to leave the surviving partner without any additional income. A second strategy involves the payment of a fixed annuity, even after the death of the first spouse (i.e. *joint and full survivor annuity*). A third strategy implies that after the decease of the first partner, a ratio of the annuity is paid to the surviving partner (i.e. *joint and last survivor annuity*). The ratio is often set at two-thirds of the initial annuity (Brown, 2002; Brown & Poterba, 2000; Murray, 1964). Exploratory calculations indicate little difference between the level of the *joint and full survivor annuity* and the *joint and last survivor annuity*.[80] For statistical reasons, we will draw on the second strategy, assuming the payment of a joint and full survivor annuity. The remaining life expectancy E_x in that case refers to the remaining life span of the partner with the longest life expectancy.

The SHARE module on assets includes the following questions to determine the wealth accumulated in financial assets (NW_t):

as003 About how much do you (and your partner) currently have in bank accounts, transaction accounts, saving accounts or postal accounts?
[Numerical value]

as007 About how much do you (and your partner) currently have in government or corporate bonds?
[Numerical value]

as011 About how much do you (and your partner) currently have in stocks or shares (listed or unlisted on stock market)?
[Numerical value]

as017 About how much do you (and your partner) currently have in mutual funds or managed investment accounts?
[Numerical value]

To determine the secondary residence equity, we drew upon the following question included in the housing module of the SHARE. It refers to an estimation of the market value of the secondary residence:

ho027 In your opinion, how much would this property be worth now if you sold it?
[Numerical value]

[80] Furthermore, the closer the ratio for the calculation of the *joint and last survivor annuity* to 1, the closer it resembles the *joint and full survivor annuity* (Brown, 2002).

2.2.2 The (potential) contribution from home ownership

To include the contribution from home ownership, different strategies can be used (see Table 7.8). These strategies differ in the account that is given to the market value of the property, the costs related to home ownership, etc.

Table 7.8. Overview of strategies to include the contribution from home ownership

Market value approach (National accounts approach)	Gross market rent of similar dwellings (GR), including all related costs (C) (e.g. operation and maintenance costs, reparations, service costs, ...): $IR = GR + C$
Opportunity cost approach (Rental equivalence method)	Net imputed rent (IR), taking account of costs (C), depreciation of the property (D) and interest on mortgage payments (I): $IR = GR - C - D - I$
Capital market approach (User-cost method)	Owner-assessed value of the property, taking account of outstanding mortgages, multiplied with the sum of inflation and the rate of return on capital: $IR = (HV - M) * (inflation + return)$
Self-assessment approach	Potential rent as estimated by owner: $IR = owner\ estimated\ rent$
Reverse mortgage approach	Regular annuity based on a percentage of the owner-assessed housing wealth (PLF*HV), the remaining mortgage (M), the life expectancy, and the long-term interest rate (A_n): $RM = PLF * (HV - M) * A_n$
Reduction of home equity approach	Simulation of housing equity under assumption that property is sold and a smaller dwelling is purchased. Fictitious annuity based on value difference of larger and smaller dwelling, including interest rate and life expectancy.

Sources: Frick, Grabka, Smeeding, & Tsakloglou (2008); Frick & Grabka (2003); Lefebure, Mangeleer, & Van Den Bosch (2006); Yates (1994)

To include home ownership in our analysis, we use the reverse mortgage approach, that combines the optimal use of the property's value with a guaranteed right of residence for the older home owner(s). Such a reverse mortgage simulation "allow[s] individuals to convert some of the equity they have in their homes into a steady income stream, without giving up residence in them." (Bartel, Daly, & Wrage, 1980, p. 477). A mortgage is taken out on a percentage of the dwelling's value, providing the household with a fixed annuity and the assurance that they can continue living in their house until they die or until the property is sold.

Because the legal framework for reverse mortgaging is absent in Belgium[81], and inspired by the approach of Lefebure et al. (2006), we draw on information from the US Home Equity Conversion Mortgages for Seniors scheme (HECM) of the US Department Housing and Urban Development (2013) to calculate the reverse mortgages.[82] Central in the formula is the principal limit factor (*PLF*), that "indicates which percentage of the value of the house may be taken into account in determining the maximum size of the loan" (Lefebure et al., 2006, p. 8). The *PLF* depends on the age of the home owner(s) and on the average mortgage interest rate (4,33%), and varies between 60% and 80%, depending on the age of the home owner.[83] For couples, the age of the youngest partner is taken into account to ensure that the housing wealth is not entirely spent when the oldest partner dies. This resembles the *joint and full survivor* strategy discussed before. The following formula is used to determine the total value of the reverse mortgage (*RM*):

$$RM = (HV - M) * PLF$$

in which *HV* refers the value of the property and *M* refers to the mortgage that has to be repaid. The total value of the reverse mortgage is transposed to a fictitious annuity (RM_{An}) using the formula that was used to calculate the fictitious annuities from financial asset and secondary residence ownership (cf. supra)[84]:

$$RM_{An} = (HV - M) * PLF * \frac{r}{1 - (1 + r)^{-E_x}}$$

In the SHARE, both the market value of the house (*HV*) and the remaining mortgages (*M*) are provided by the respondent in the housing module:

ho024 In your opinion, how much would you receive if you sold your property today?
[Numerical value]

ho013 Do you have mortgages or loans on this property?
1. Yes
5. No

ho015 How much do you or your partner still have to pay on your mortgages or loans, excluding interest?
[Numerical value]

[81] However, political initiatives have been taken to introduce reverse mortgaging as an insurance product in Belgium. A first bill to create a reverse mortgage scheme (pension credit) was proposed in 2009 (DOC 52 2152/001) (De Block, Schiltz, Staelraeve, & Defreyne, 2009). This bill was again proposed in 2011 (DOC 53 1229/001) (De Block, 2011), but until now it has not been adopted. However, despite the lacking legal framework for reverse mortgaging as an insurance product, in Belgium home owners can sell their property, and instead of receiving the purchase price as a single lump sum, they can choose to receive lifelong annuity payments (*verkoop op lijfrente*) (see also Delta Lloyd, 2014; Koninklijke Federatie van het Belgisch Notariaat, 2014).

[82] For more information on the US Home Equity Conversion Mortgages for Seniors scheme, consult the website of the US Department Housing and Urban Development: http://portal.hud.gov/.

[83] The PLF by age are included in annex appendix 4.

[84] In appendix 5 we illustrate the simulation of the potential contribution from assets to the old age income package.

2.2.3 Reflections on the inclusion of assets in the extended income package

Some critical notes have to be made regarding the inclusion and simulation of assets as part of the extended old age income package.

First, we can have doubts about the knowledge individuals have about the value and the amount of assets they possess, as well as the revenues (both rent and interests) these assets yield. Little research exists that compares the amount of wealth reported by individuals in surveys and the actual amount of wealth they have (Avery, Elliehausen, & Kennickell, 1988; Curtin, Juster, & Morgan, 1989; Kennickell & Starr-McCluer, 1997). Overall, the reported asset stock diverges to a certain extent from the actual amount, although factors like question wording, population sampling, etc. can contribute to the quality of the data. This also holds for property assets. Research has found a general overestimation of about 5% of the market value of the house when assessed by the property owner in comparison with the actual transaction prices (e.g. DiPasquale & Somerville, 1995; Goodman Jr. & Ittner, 1992; Kiel & Zabel, 1999). This has to be kept in mind when looking at the analysis results.

Second, it is generally known that income and wealth questions in surveys suffer from important degrees of item non-response. This is not different in the SHARE. To overcome problems related to item non-response, imputed values provided by the SHARE research team are used (cf. chapter 6). Imputations are most important for financial assets. More than half of the amounts on financial assets are imputed values (resp. 55% and 70%). For property, item non-response rates are lower and imputations are needed for 10% of the values of home ownership and for 21% of the values of secondary residence ownership (see Table 7.9). As already mentioned, using imputed values increases the risk to systematic mistakes in the research results. Therefor we investigate the influence of imputations on the research results in the sensitivity analysis (Appendix 3).

Table 7.9. Relative distribution of the research population according to imputations for assets (unweighted, 2007)

	No imputations (%)	Imputations (%)	Total (N)
Financial assets			
Amount	45	55	1603
Interest	30	70	1603
Home ownership			
Value	90	10	1320
Secondary residence			
Value	79	21	281
Rent	83	17	135

Source: Author's calculations based on SHARE data wave 2

Third, the financial contribution from home ownership depends on the technique used to take account of home ownership (cf. supra, Table 7.9). However, according to a comparison between the different methods by Lefebure et al. (2006) and Verbist and

Lefebure (2008), the results of the different methods are comparable on the aggregate level.

Fourth, we should keep in mind that the simulation of fictitious annuities does not refer to a real-life situation. Nothing is said about the willingness of households to actually spend the wealth, accumulated in financial and property assets. When discussing the simulated contribution from assets and the protection provided by the extended old age income package, which includes the simulated asset contribution, we thus present a mathematical exercise that does not fit with reality. We do not state anything about the willingness of the elderly population to actually transpose their assets into a regular income.[85] However, we evaluate the fictitious annuity simulation as a good indicator of the potential contribution from wealth to the old age income package.

Fifth, in calculating fictitious annuities we do not take account of transaction costs or taxes that have to be paid when transposing financial assets to a regular annuity payment. Moreover, we do not take account of potential differences in the consumption needs of the older population, in that for example younger pensioners have other consumption needs than older pensioners (e.g. the last group probably has more care related costs than the younger group). Also, no account is given to the future inflation, which has an influence on the consumption value of the fictitiouos annuity.[86]

Lastly, as was the case with the personal income sources, the contribution from financial and property assets is only included when the respondent indicated ownership of these assets. In case ownership information was missing, the assets package generosity was also set to be missing.

3. Taking account of financial solidarity within the household

We expect a minimum degree of financial solidarity and the sharing of the disposable income between household members to exist. Living together with a partner (or with other household members) leads to returns of scale, because some households costs, like heating, are independent of the number of household members. In addition, to a certain extent financial solidarity also is incorporated in the Belgian pension system. More advantageous calculation rates are used in the retirement pension calculation for pensioner couples than for singles, resulting in the granting of so-called family pensions (calculated at 75% of the previous wage) and singles pensions (calculated at 60% of the

[85] Literature has shown that the elderly are generally not very willing to reduce their asset wealth. Only in the case of the decease of one's partner or important declines in health and functional status, the tendency to consume property assets increases importantly (Venti & Wise, 1990, 2004; Walker, 2004).

[86] In the study of Capeau and Pacolet (2009), more attention is paid to the age-related consumption differences.

previous wage). Lastly, financial solidarity between partners is explicitly laid down by law for married couples. The Belgian Civil Code explicitly foresees that in a common marriage settlement the disposable income (e.g. pensions, social security benefits, rental incomes, etc.) is shared between married partners.[87]

Equivalent incomes are calculated to take account this financial solidarity. Several equivalence scales have been developed (see Table 7.10), however, for our analyses, we use the modified OECD equivalence scale, which gives a value of 1 to the first adult in the household, and a value of 0.5 to all other adults in the household (Hagenaars, de Vos, & Zaidi, 1994; Organisation for Economic Cooperation and Development, 2009).

No account is given to the possible cohabitation with (adult) children, because no sufficient information is included in the SHARE to determine the income of household members (apart from the respondent's partner). This is the case for about 7% of the research population (126 respondents) that live together with a child or a child-in-law.

Table 7.10. Overview of the most commonly used equivalence scales

	Household income is divided by ...
Oxford equivalence scale	... a factor that assigns a value of 1 to the first adult; 0.7 to the other adults and 0.5 to every child in the household
OECD modified equivalence scale	... a factor that assigns a value of 1 to the first adult; 0.5 to the other adults and 0.3 to every child in the household
Square root equivalence scale	... the square root of the number of household members

Source: Organisation for Economic Cooperation and Development (2009)

One should be aware of the effect of the equivalence scale on the research results: applying a different equivalence scale could yield different research results. According to Förster (1994), when a greater weight is given to each additional household member the share of singles and older married couples in the low-income population decreases. More attention will be paid to the influence of the equivalence scale on the research results in the sensitivity analysis (see Appendix 3).

4. Overview of the generated variables

To round up, we recapitulate on the different generated variables that will be used to assess the generosity of the old age income package. This should enhance the understanding of the research results in the next chapter. We differentiate income from personal income sources (also called the personal income package); the income from assets, with a difference between the direct income from assets and the simulated income

[87] Art. 1405 of the Civil Code. For more information, see Berghman et al. (2009).

from assets; and the income from all income sources (also called the extended income package). In the extended income package we make a difference between the extended available income package and the extended simulated income package. An overview is provided in Table 7.11.

Table 7.11. Overview of the generated income variables

Personal income sources	Income sources with personal entitlement like pensions, wages, social security benefits etc.
Personal income package	Cluster of personal income sources (see 2.1.2)
Income from personal sources	Income from different income sources with personal entitlement
Asset sources	Financial assets, home ownership and secondary residence
Direct asset income	Income from interests on financial assets, plus rental incomes from secondary residence
Simulated asset income	Reverse mortgaging from home ownership, plus fictitious annuity from financial assets, plus fictitious annuity from secondary residence
Total available income	Income from personal sources, plus the direct asset income
Total simulated income	Income from personal sources, plus the simulated asset income

5. Assessing the quality of the old age income package

To assess the quality of the old age income package, and to investigate whether the old age income package succeeds in providing sufficient protection against the financial dimension of old age dependency, we focus on the extent to which the old age income package protects the elderly population against poverty. In addition, we also focus on the contribution of the old age income package to enhancing income equality among the older population.

For the selection of relevant indicators, we draw on the EU indicators developed to monitor the European Strategy for Social Protection and Inclusion, which are included in the Social Protection and Social Inclusion Portfolio (European Commission Directorate Employment, Social Affairs and Equal Opportunities, 2009).

5.1 Protecting against old age poverty

In its overall definition, poverty is considered as a relative, destitute situation based on a comparison of the individual situation and the general standard of living of the society one lives in. In social research, the poverty risk is operationalised in monetary terms, with an at-risk-of-poverty threshold equal to 60% of the median equivalent household income for the entire population, not taking account of assets (European Commission, 2010a). However, because the SHARE data are only collected for the population aged 50 and over,

it is impossible to calculate this type of at-risk-of-poverty threshold using only SHARE data. Yet, also other strategies are available to estimate other poverty thresholds with the SHARE data.

In the first strategy, we could introduce the EU-SILC poverty threshold in our analyses based on the SHARE data. The EU-SILC is considered to be a high standard and widely used instrument for the registration of comparable income data and (social) policy research in Europe. The EU-SILC poverty threshold is used in the bulk of poverty and social policy research. The EU-SILC poverty threshold reflects the "share of persons with an equivalised disposable income below 60% of the national equivalent median income". The national equivalised median income reflects the income situation of the entire population, because income data in the EU-SILC are not limited to the income of the elderly population as is the case with the SHARE. In 2007, the EU-SILC poverty threshold was 878 Euros per month for a single person. However, because of differences in the income concept of the SHARE and the EU-SILC, the EU-SILC poverty threshold cannot be transposed to analyses with data from the SHARE. This would inflict important differences in the research results. Consequently, we have chosen not to use this strategy

A second strategy is inspired by Lyberaki and Tinios (2008). They calculate age-specific poverty thresholds with SHARE data and adjust them taking account of income information from the entire population. In doing so, we calculate EU-SILC correction factors[88], which are the ratio between the median equivalent income of the elderly population and the median equivalent income of the entire population (Eurostat, 2012). The correction factors are used to estimate the median equivalent income of the entire population using the median equivalent net income of the elderly population in the SHARE and to calculate adjusted poverty rates (60% of the median adjusted equivalent net income) (see Lyberaki & Tinios, 2008). Because this strategy makes it possible to compare the income situation of the older population with that of the entire population, we will use this to determine the quality of the old age income package. In Table 7.12, we present the SHARE median equivalent net income from personal income sources before adjustment (A); the EU-SILC correction factor (B); the adjusted SHARE median equivalent net income (A/B); and the adjusted SHARE poverty threshold (60% of the adjusted SHARE median equivalent net income) (60% A/B). The equivalent adjusted SHARE poverty threshold thus is 793 Euros per month (weighted).

[88] We chose the EU-SILC for the calculation of the correction factors, because it is considered to be a high standard and widely used instrument for the registration of comparable income data and (social) policy research in Europe.

Table 7.12. Calculating the EU-SILC adjusted SHARE at-risk-of-poverty threshold for Belgium

(A)	(B)	(A/B)	(60% A/B)
SHARE median equivalent net income (weighted)	**EU-SILC correction factor**	**Adjusted SHARE median equivalent net income (weighted)**	**Adjusted SHARE poverty threshold (weighted)**
1067	0.8066	1322	793

Note: EU SILC correction factor $= \frac{\text{median income of population aged 60 and over (based on EU-SILC)}}{\text{median income of overall population (based on EU-SILC)}}$

Source: Author's calculations based on SHARE data wave 2

A downside of using the adjusted SHARE poverty threshold is that it is limited to the personal old age income package. Because in the EU-SILC assets are not included in the income concept in the same way as in our research, the adjusted SHARE poverty threshold cannot be calculated for the extended old age income package.[89]

A third strategy is to calculate age-specific poverty thresholds. These thresholds do not compare the income situation of the elderly population with that of the entire population; they only reflect the income situation of the elderly population. Consequently, it reduces the potential to use the research results for social policy goals. Yet, when we use age-specific poverty thresholds we can calculate poverty thresholds before and after the inclusion of assets in the extended income package. In doing so, the poverty threshold takes account of the distribution of assets among the elderly population, which compensate the lack of a completely relative approach when we stick to the EU-SILC adjusted SHARE poverty threshold to evaluate the quality of the extended old age income package. We calculate three age-specific poverty thresholds based on the income from:

- the personal old age income package (i.e. before assets);
- the extended available old age income package (i.e. after assets: interests from financial assets, plus rental incomes from secondary residence);
- the extended simulated old age income package (i.e. after assets: reverse mortgage on home ownership, plus fictitious annuities from financial assets and secondary residence).

The poverty thresholds, calculated as 60% of the median net equivalent monthly income from the income sources listed above, are shown in Table 7.13. Note that the age-specific poverty threshold is about 20% lower than the EU-SILC adjusted SHARE poverty threshold presented in Table 7.13.

[89] We however do use the adjusted SHARE poverty threshold to assess the quality of the extended old age income package. Yet, this is not a completely relative approach, in that is does not take account of the distribution of assets among the population. More details on this approach are provided in chapter 8.

Table 7.13. The age-specific poverty threshold before and after the inclusion of assets in the old age income package (weighted, 2007)

	(A)	60% (A)
	Median income (weighted)	**Age-specific SHARE poverty threshold (weighted)**
Before assets	1066	640
After assets		
Available income	1167	701
Simulated income	2122	1273

Source: Author's calculations based on SHARE data wave 2

In addition, we also calculate an asset poverty threshold to investigate whether the asset stock provides a sufficient buffer against unexpected financial shocks. Households with a small asset stock will be more vulnerable when confronted with sudden large expenditures than households with a large asset stock. Following Brandolini, Magri and Smeeding (2010) we consider the asset poverty threshold as having a financial asset stock equal to three months of the minimum household income needed to stay above the poverty threshold. Obviously, account has to be given to the household composition when assessing asset poverty. The equivalent asset stock must be above 2379 Euros[90] to provide minimum protection in case the household is confronted with a short period of unexpected income deprivation. Note that only the financial asset stock is used to calculate the asset poverty threshold. Financial assets are available for direct consumption, while property ownership as such cannot be consumed immediately.

5.2 Contributing to income equality

The quality of the old age income package does not only reflect the extent to which it provides protection against old age poverty, but also the extent to which it contributes to an equal income distribution among the elderly population. As discussed in the second chapter, contributing to social equality and a vertical redistribution of resources is one of the main goals of public social protection.

We will use the following indicators to investigate the (in)equality of the income distribution among the elderly population:

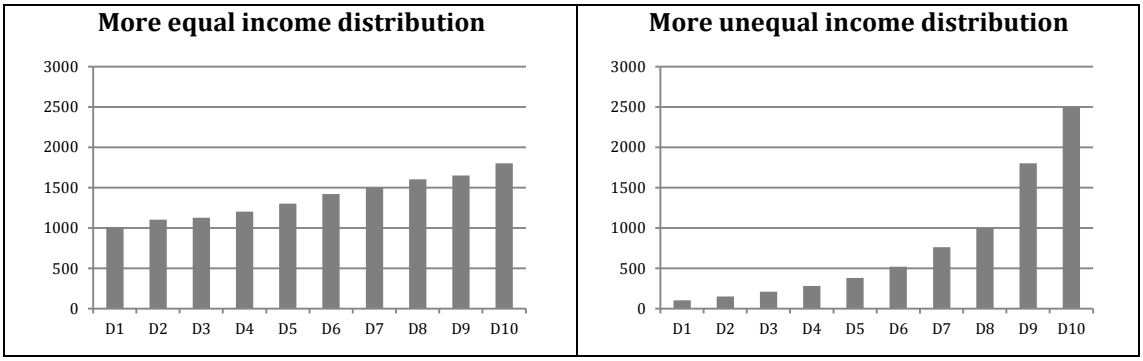
- the income decile distribution,
- the S80/S20 income ratio, and
- the Gini coefficient and the Lorenz curve.

For the income decile distribution, we range the research population based on their income (from low to high), and divide them in ten equal size groups (the deciles). Mean

[90] I.e. three times the EU-SILC adjusted SHARE poverty threshold of 793 Euros.

and median incomes are calculated in each decile. The differences between the income deciles give a first view on the income distribution among the elderly population. This is illustrated in Figure 7.1. Little differences in the mean and the median of the deciles indicate a more equal income distribution (left graph), while large differences indicate a more unequal income distribution (right graph).

Figure 7.1. Illustration of income decile distribution



The second indicator is the income quintile share. This is the ratio between the income of the top quintile of the population (i.e. the total income of the 20% of the population with the highest incomes) and the income of the bottom quintile of the population (i.e. the total income of the 20% of the population with the lowest incomes).

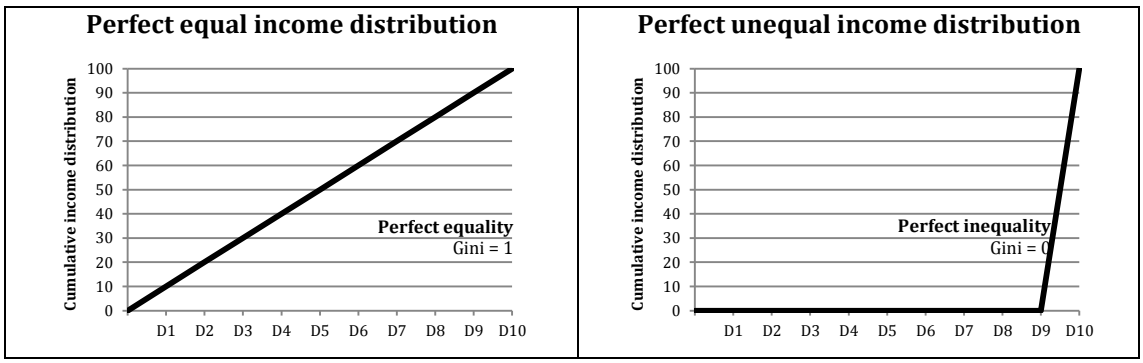
$$\frac{\text{S80}}{\text{S20}} = \frac{\text{Total equivalised income of 20\% of population with highest incomes}}{\text{Total equivalised income of 20\% of population with lowest incomes}}$$

The income quintile share focuses on the extremes in the income distribution. A higher income quintile share indicates large differences between the upper and the bottom income quintile, and reflects a higher degree of inequality in the income distribution. A lower income quintile indicates smaller differences between the upper and the bottom income quintile, and reflects a smaller degree of income inequality.

The third and fourth indicator are the Gini coefficient and the Lorenz curve. Both are commonly used indicators to calculate income inequality in the population. They give a more general view on the income distribution and focus less on the differences between the extreme income groups than the income quintile share. The Gini coefficient and the Lorenz curve take account of the share each individual in the population has in the overall income. The Lorenz curve plots the cumulative proportion of the population with lower to higher incomes on the X-axis, and their cumulative share in the overall income on the Y-axis. This is illustrated in Figure 7.2. In a situation of perfect equality, each member of the population has an equal share of the total income, and the plotted line resembles the 45° diagonal (left graph). In a situation of perfect inequality, one member of the population has all income, while the rest has no income. In that case, the plotted line is a vertical line at the right side of the cumulative distribution (right graph). The Gini-coefficient refers to the surface of the area below the Lorenz curve. A Gini-coefficient equal to 0 refers to a situation of perfect inequality, while a Gini-coefficient of 1 refers to a situation of perfect

equality. The closer the Gini-coefficient is to 1, to more equal the income distribution will be.

Figure 7.2. Illustration of the Lorenz curve and Gini coefficient



The Gini-coefficient and the Lorenz curve are computed in SAS using the SAS code written by P. N. Cohen (University of Maryland, Department of Sociology), based on the computation of the Gini coefficient in Shryock, Siegel and Stockwell (1976).[91]

6. Conclusion

In this chapter, the operationalisation of one of the main concepts of the research was presented: the old age income package. A difference was made between the personal income package, including only income sources with personal ownership, and the extended income package, including also asset sources that are shared within the household. The operationalisation of both the ownership and the level of the income package were presented. In the last section, we presented a number of indicators to assess the protection the old age income package provides against the negative consequences related to the financial dimension of old age dependency.

In the next chapter we focus on the analyses of the old age income package. We investigate the composition and the generosity of the personal and the extended old age income package, as well as the level of protection the income package provides against the financial dimension of old age dependency.

[91] The Gini SAS code is available on http://www.terpconnect.umd.edu/~pnc/gini.sas

CHAPTER 8

THE OLD AGE INCOME PACKAGE UNRAFFLED[92]

[92] A part of this chapter is published as: Verpoorten, R. (2015). Including assets in comparative old age poverty research: How does it change the picture? In I. Salagean et al. (Reds.), *The young and the elderly at risk: Individual outcomes and contemporary policy challenges in European societies*. Intersentia.

CHAPTER 8. THE OLD AGE INCOME PACKAGE UNRAFFLED

How is the income package of the elderly population composed? What level of protection is provided by the income package? And what determines its composition and generosity? In this chapter, we investigate the use of different income and asset sources by the older population, and their combination into old age income packages. The following research questions are addressed:

RQ 1a. How is the old age income package composed?

RQ 1b. How generous is the old age income package?

RQ 1c. What is the relationship between the composition and the generosity of the old age income package?

RQ 1d. What sociodemographic and socioeconomic background factors influence the composition and the generosity of the old age income package?

RQ 3a. To what extent does the old age income package provide protection against the financial dimension of old age dependency?

Differences and inequalities between the elderly population in the level and the composition of the old age income package are discussed. In addition, we assess the quality of the protection the old age income package provides against the financial dimension of old age dependency. To what extent does the old age income package manage to provide sufficient income levels in old age and how does it contribute to old age income inequality? In particular, we assess the potential of asset sources to improve the quality of the old age income package. Does taking account of assets in the extended income package reduce the overall at-risk-of-poverty rate, and how does it influence inequalities in the income distribution? Based on the research questions, we have formulated the following hypotheses:

H1. Elderly with a higher degree of diversification in their income package are expected to enjoy higher levels of income protection than elderly with a low degree of income diversification.

H2. Elderly with a more diverse and/or a more generous personal income package are expected to have more access to asset sources than elderly with a less generous personal income package.

H3. The (potential) contribution from asset sources is expected to higher for elderly with a more diverse and/or a more generous personal income package than for elderly with a less diverse and/or less generous personal income package.

H4. (Single) Women, the oldest elderly and low-status elderly are expected to be in a more vulnerable position regarding the composition and the generosity of their income packages.

H5. Elderly with a more diverse and/or a more generous old age income package are expected to enjoy a higher level of protection against the financial dimension of old age dependency.

In the first section of this chapter, we introduce the broad research strategy and the conceptual scheme that includes all variables of interest. In the second section, the income package exclusively including income sources with personal entitlement is investigated (i.e. the personal income package). We investigate both the composition and the generosity of the income package, as well as the relationship between the composition and the generosity. We also address the quality of the old age income package in terms of providing protection against poverty and the equality of the income distribution. In the third section, the asset sources (i.e. home ownership, financial assets and secondary residence) that are shared at the household level are explored. We look at the direct contribution from assets, but we also simulate the potential asset contribution assuming a complete spending of the asset stock over the remaining life course. In section 4, personal income sources and asset sources are combined into the extended old age income package. We investigate the level of income protection derived from this package. We also compare the quality of the personal old age income package with that of the extended old age income package to assess the influence of including assets on the poverty risk and the equality of the income distribution. Throughout the sections we pay attention to a number of vulnerable groups, like women and the oldest elderly, to link the old age income package to the sociodemographic and socioeconomic background of the research population.

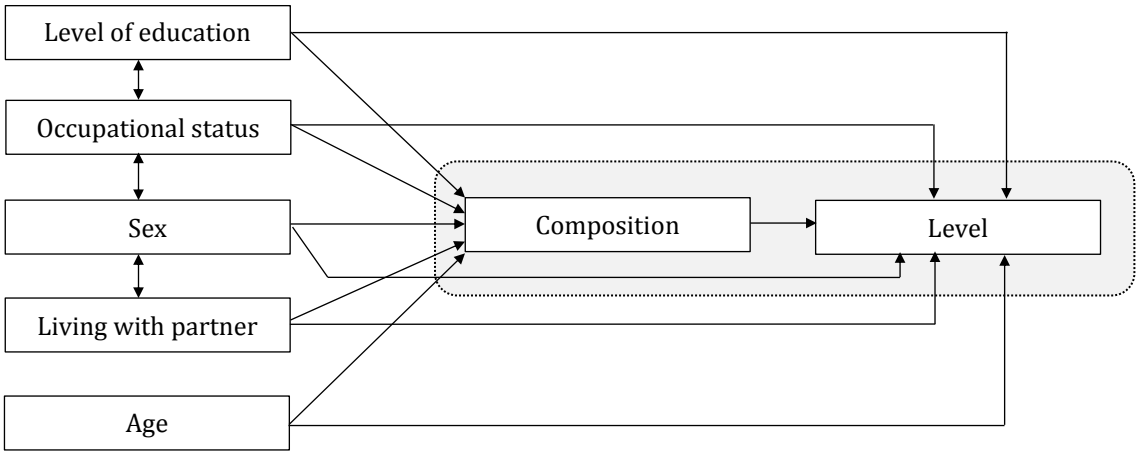
1. Overall research strategy

The first research question on the composition and the level of protection provided by the old age income package is based on a conceptual scheme which includes the level of education (as a proxy for socioeconomic status), sex, occupational status (as a proxy for labour market history), and living situation (with a partner or single) as the main sociodemographic and socioeconomic background variables[93]. The composition and the level of protection provided by the old age income package are the main dependent variables. Also the relationship between the income package composition and the level of

[93] The operationalisation of the sociodemographic and socioeconomic background variables is included in appendix 7.

income protection is investigated, as well as the quality of the old age income package (see Figure 8.1).

Figure 8.1. The old age income package: Conceptual scheme



To map the composition of the income package, both descriptive and explanatory statistical techniques are used. The distributions of the categorical variables and their mutual relationships are displayed in cross tables. These cross tables give some first insights into the distribution of the main variables, and allow us to explore the data and get some first insights in potentially interesting relationships. In the cross tables we evaluate whether the relationship between the variables are significant using the appropriate test statistics (Pearson Chi^2, Kruskal-Wallis Chi^2, etc.). Multivariate techniques are used to investigate whether the background variables in the model are decisive in explaining the composition and the level of protection provided by the old age income package. In addition, multivariate models allow us to assess the unique influence of the different independent variables on the main dependent variables. The choice of the appropriate multivariate techniques depends on the character of the dependent variables (i.e. categorical or metric dependent variables). This is discussed more in detail in the following sections.

2. The old age income package of personal income sources

In this section, we focus on the composition and the generosity of the old age income package. In this stage only income sources with personal entitlement, like pensions, wages and social security benefits, are included. No account is given to the sources that are shared within the household, like financial assets and property ownership.

To start off, we describe the composition and generosity of the personal old age income package. Also the relationship between the composition and the generosity of the package is investigated. Secondly, bivariate statistics on the old age income package and the main

stratification determinants (e.g. sex, occupational status, level of education) are presented. Thirdly, we present two multivariate models to investigate whether the background determinants are significant in explaining the composition and the generosity of the old age income package.

2.1 Description of the old age income package

First, the composition of the personal old age income package is assessed. Table 8.1 shows the weighted distribution of the research population by the composition of the personal income package. About one third of the elderly population receives a only a first pillar pension (32%), and 28% combines a first pillar pension with a private third pillar pension. About 9% of the research population has a second pillar pension combined with a first pillar pension, while only 6% has an income from (self)employment (either or not in combination with other personal income sources). 11% of the elderly population does not have any personal income sources at his/her disposal, and 7% receives only a third pillar pension or has received this income source in the past (cf. supra: operationalisation of third pillar pension ownership).

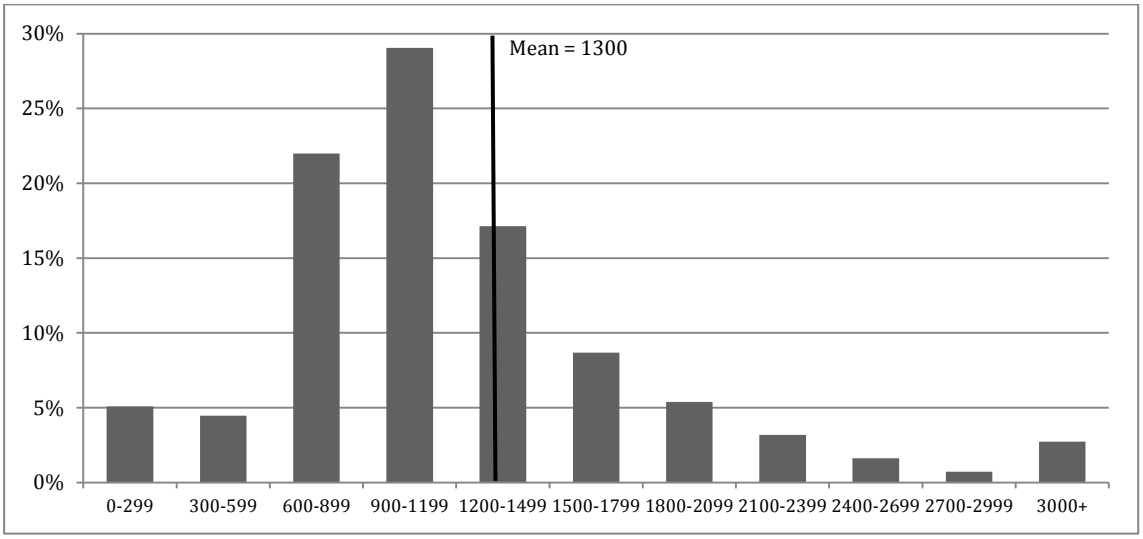
Table 8.1. Distribution of the research population by personal income package composition (weighted, 2007)

	Personal income package	**N**	**%**
P1	First pillar pension	542	32
P2+P1	Second and first pillar pension	148	9
P1+P3	First and third pillar pension	473	28
SS+other	Social security benefits, plus other sources	133	8
Wage+other	Wage, plus other sources	94	6
Only P3	Only third pillar pension	109	7
None	None	176	11
	Total	**1676**	**100**

Source: Author's calculations based on SHARE wave 2

The average equivalent net income from the personal old age income package is 1300 Euros per month. Half of the research population has an income below 1067 Euros per month. In Figure 8.2, that shows the distribution of the research population by the monthly equivalent net income from the personal income package, we see that about 5% of the research population has a very low income (below 300 Euros per month), while about 3% has a very high income (above 3000 Euros per month).

Figure 8.2. Distribution of the research population by the monthly equivalent net income from the personal income package, in categories (weighted, 2007)



Source: Author's calculations based on SHARE wave 2

When we look at the quality of the old age personal income package, we find that about 21% of the research population has an equivalent monthly net income from personal income sources below the at-risk-of-poverty threshold of 793 Euros per month (the adjusted SHARE poverty threshold: cf. chapter 7). Concerning the (in)equality of the income distribution, the Gini coefficient is 0.3391 and the total equivalent net income from personal income sources of the top income quintile is about 5.0 times larger than that of the bottom quintile (income quintile share S80/S20=5.0787), indicating a warp in the income distribution favouring the highest incomes.

Further, we investigate the relationship between the composition and the level of the personal old age income package to assess whether more diverse income packages generate higher levels of income protection. This is confirmed in Table 8.2. Elderly with only a first pillar pension (P1) receive on average 1145 Euros per month, while those combining a first and a third pillar pension (P1+P3) receive on average 1545 Euros. Elderly with a second and a first pillar pension (P2+P1), together with the group of elderly that still receives a wage from (self-)employment (wage+other) are the best of: on average, their personal income sources generate about 1700 Euros per month. Elderly without any personal income sources (none) are in the least favourable situation with an equivalent income of about 694 Euros per month.

When we look at the median income levels, the same trends are found. The median income of elderly with only a first pillar pension is smaller than that of elderly combining their first pillar pension with a second or a third pillar pension (resp. 1048 Euros versus 1193 and 1237 Euros). Elderly that receive a wage have the highest median income (1451 Euros), while elderly without personal income sources have the lowest median income (733 Euros).

Table 8.2. Mean and median monthly equivalent net income from the personal income package by personal income package composition (weighted, 2007)

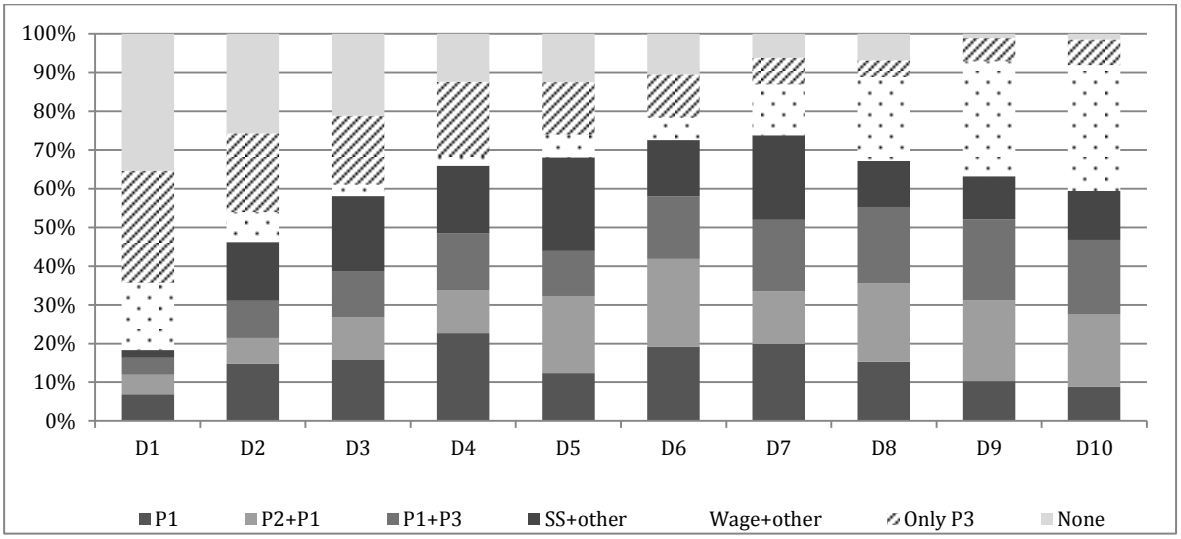
	N	Mean	Median
Personal income package			
P1	543	1145	1048
P2+P1	146	1699	1193
P1+P3	461	1545	1237
SS+other	113	1436	1066
Wage+other	81	1705	1451
Only P3	107	946	833
None	179	694	733
Total	**1630**	**1300**	**1067**

Note: The income differences between the income package compositions are statistically significant (Kruskal-Wallis Chi^2=253,8360; DF= 6; p<0,0001)

Source: Author's calculations based on SHARE wave 2

When we look at the distribution of the personal income package composition in the overall income distribution, we can draw two conclusions (see Figure 8.3). First, the prevalence of elderly without personal income sources, as well as those with only a private, third pillar pension, decreases when moving up the income distribution. In the first income decile 34% of the research population has no personal income and 28% has a third pillar pension, while in the upper income decile this holds for resp. only 1% and 5% of the research population. Second, and in the opposite direction, the incidence of having a second pillar pension increases when moving up in the income decile distribution. In D1 only 4% of the research population has an occupational (second pillar) pension, compared to 13% in D10. Similarly, only 4% of the research population in the lowest income decile combines a first pillar pension and a third pillar pension, while this is the case for 14% of the research population in the upper income quintile.

Figure 8.3. Personal income package composition by income decile distribution (weighted, 2007)



Source: Author's calculations based on SHARE wave 2

In addition, Table 8.3 shows the EU-SILC adjusted at-risk-of-poverty rate of the research population by the composition of the personal old age income package. The poverty risk is found to be largest for elderly without personal income sources and for elderly that only have a third pillar pension: Respectively 55% and 42% have an income below the poverty threshold of 793 Euros per month. To put it differently, almost one third of the older population at-risk-of-poverty does not have personal income sources. The poverty rate is lowest among the elderly receiving a second or a third pillar pension. About 10% of the research population that combines a second or a third pillar pension with a first pillar pension has an income below the EU-SILC adjusted poverty threshold. In the largest group, those with only a first pillar pension, about 19% has an income below the EU-SILC adjusted at-risk-of-poverty threshold.

Table 8.3. EU-SILC adjusted at-risk-of-poverty rate of the research population by the personal income package composition (%, weighted, 2007)

%	Above poverty threshold	Below poverty threshold	Total (N)
Personal income package			
P1	81	19	523
P2+P1	90	10	146
P1+P3	89	11	460
SS+other	85	15	130
Wage+other	78	22	89
Only P3	58	42	109
None	45	55	174
Total	**79**	**21**	**1631**

Note: The at-risk-of-poverty threshold is calculated as 60% of the EU-SILC adjusted median equivalent net monthly income from personal income sources. See chapter 7 for more details.

Source: Author's calculations based on SHARE wave 2

2.2 The personal income package: tracing vulnerable groups

Certain groups of elderly are considered as more vulnerable than others. This vulnerability is multidimensional, yet, given our research questions, we focus on income vulnerability (i.e. poverty risk). For example, single women, the oldest elderly, and elderly who have encountered problems during their labour market career are considered as more vulnerable: they often have a less favourable old age income package, enjoy lower levels of income protection and have a higher poverty risk. In this section, we trace these vulnerable groups and examine the income protection they enjoy from their personal old age income package.

We first assess whether differences in the composition of the personal old age income package are related to certain sociodemographic and socioeconomic background characteristics of the research population. In particular, we focus on groups that can be considered as vulnerable with regard to their income package composition. Based on the relationship between the at-risk-of-poverty rate and the personal income package composition presented in the previous section, elderly with a low degree of diversity in their income package (i.e. having only a first pillar pension), or without meaningful personal income sources (i.e. having only a third pillar pension or no personal income sources) are considered as more vulnerable. Table 8.4 presents the relative distribution of the research population by the composition of the personal income package and by a selection of sociodemographic and socioeconomic stratification determinants (i.e. sex, age, occupational status, level of education and living situation).

Table 8.4. Relative distribution of the research population by the personal income package composition and by sex, age, occupational status, level of education and living situation (weighted, 2007)

	Personal income package							
%	P1	P2+P1	P1+P3	SS+other	Wage+ other	Only P3	None	**Total (N=100%)**
Sex								
Male	27	14	31	11	8	5	3	747
Female	37	4	26	5	3	8	16	929
Age								
60-74	21	8	32	11	8	9	11	1079
75+	52	10	21	3	2	3	10	597
Occupational status								
Salariat	22	16	39	7	8	4	4	561
Intermediate	35	8	27	9	7	6	8	389
Working class	41	4	25	11	4	8	7	475
None	35	3	11	2	2	11	37	186
Education								
High	22	11	40	7	9	6	5	359
Intermediate	30	10	27	8	6	9	10	766
Low	43	5	22	9	3	4	14	536
Living situation								
Couple	25	10	29	7	6	9	14	1085
Single	46	7	26	10	5	2	3	592
Total	**32**	**9**	**28**	**8**	**6**	**7**	**11**	**1676**

Note: The bivariate relationship between the background determinants and the income package composition is significant at the 0,05 level for all background variables (based on the Pearson Chi^2 test statistic).

Source: Author's calculations based on SHARE wave 2

In Table 8.4 we see that higher proportions of older women, the oldest elderly (75 years and over), elderly with a low occupational status (i.e. working class or without employment), elderly with a low level of education and single living elderly have only a first pillar pension. The lower degree of diversity in the income packages of these groups exposes them to a potentially more vulnerable situation. Higher proportions of older men, elderly between 60 and 74 years, elderly with a higher occupational status, resp. level of education, and elderly living with a partner have a more diverse personal old age income package. These groups thus are considered as being less vulnerable. For example, elderly that combine a first and a second pillar pension overall are younger (between 60 and 74 years) men with a relatively high socioeconomic status (i.e. a high occupational status and/or a high level of education). Similarly, the elderly that combine a first and a third pillar pension overall are younger elderly (60-74 years) with a high socioeconomic status.

In addition, higher proportions of older women, elderly without previous employment, elderly with a low level of education, and elderly living with a partner are found to have no meaningful personal income sources. For example, 16% of the women has no personal

income sources, compared to 3% of the male research population.[94] Similarly, 37% of the elderly without previous employment have no personal income sources compared to 4%-8% of elderly with previous employment. Overall, the group of elderly without personal income sources refers to women with a lower socioeconomic status, who live together with a partner. Similarly, elderly that only have a third pillar pension most often are women between 60 and 74 years that live together with a partner.

One should note that the higher proportions of older women and elderly with a partner without meaningful income sources not necessarily result in a more vulnerable position. A part of this group is expected to live together with a partner that has personal income sources. Because of the sharing of income sources within the couple, an important proportion of the older women and cohabitating elderly without personal income sources are expected to enjoy the personal income sources of their partner.[95]

Also the level of the personal income package has an important role in protecting the older population against poverty and inequality. Table 8.5 presents the mean and median monthly equivalent income from the personal old age income package, and the related at-risk-of-poverty rate (EU-SILC adjusted poverty threshold=793 Euros). This again confirms the more vulnerable position of older women, the oldest elderly, elderly with a low occupational status and elderly with a low level of education.

[94] Or, to put it differently, 86% of those without personal income sources are women.
[95] To illustrate, almost 90% of all older women without meaningful personal income sources live together with a partner. Similarly, 87% of all cohabitating elderly without personal income sources are women living with a partner.

Table 8.5. Mean and median monthly equivalent net income from the personal income package and EU-SILC adjusted at-risk-of-poverty rate, by sex, age, occupational status, level of education and living situation (weighted, 2007)

		Income			% below
	N	Mean	Median	*p*	poverty threshold
Sex					
Male	675	1393	1100	0.0184	20
Female	955	1225	1045		23
Age					
60-74	1011	1405	1100	<0.0001	20
75+	619	1106	1022		23
Occupational status					
Salariat	525	1635	1313	<0.0001	14
Intermediate	383	1259	1004		28
Working class	465	1070	1000		19
None	190	978	937		36
Education					
High	337	1771	1428	<0.0001	12
Intermediate	744	1249	1061		22
Low	533	1057	967		27
Living situation					
Couple	1040	1379	1083	0.0059	22
Single	590	1156	1034		20
Total	**1631**	**1300**	**1067**		**21**

Note: The at-risk-of-poverty threshold is calculated as 60% of the EU-SILC adjusted median equivalent net monthly income from personal income sources. See chapter 7 for more details.

Source: Author's calculations based on SHARE wave 2

2.3 A multinomial logit model explaining the income package composition

We estimate a multinomial logit model to predict the income package composition (categorical variable) from the sociodemographic and socioeconomic stratification determinants. We investigate which background characteristics are significant in explaining the composition of the personal old age income package. We first explain the model construction, and second the results of the multinomial logit model.

2.3.1 Construction of the model

The dependent variable in the multinomial logit model is the personal income package composition, a categorical variable with seven categories (cf. supra). The reference category of the dependent variable in the model is "P1" (only a first pillar pension). Six independent variables are included in the model. These variables refer to the sociodemographic and socioeconomic background of the respondents, and are all categorical variables (reference category between brackets): sex (female), age (75+),

occupational status (no occupation), level of education (low), living situation (single), and region of residence (Brussels Capital Region).

Initially, we wanted to include two interaction effects: an interaction between education and occupational status, and one between sex and occupational status. However, the inclusion of these interaction effects led to a quasi-complete separation of data points (i.e. certain combinations of the variable categories resulted in very low frequencies or even zero observations), thus violating the logistic regression assumptions and leading to extremely high or low odds ratios, a surge in the standard errors and incorrect significance tests. Consequently, the interaction effects were not included in the model.

Further, 85 observations with missing values on one of the variables were removed from the model, leaving a sample of 1598 observations.[96] The assumptions of the logit model (i.e. linearity, multicollinearity and extreme values) were not violated. In SAS, PROC LOGISTIC with the GLOGIT link function (generalised logit) was used to estimate the model.

The overall multinomial logit model is significant (p<0.0001). At the global level all the independent variables are statistically significant (Table 8.6). According to the Nagelkerke R^2 the logit model explains about 38% of the variance in the dependent variable (max-rescaled R^2=0.3857). The odds ratios (OR)[97] and the p-values, indicating the significance of the effects, of the multinomial logit model are presented in Table 8.7.

[96] In appendix 8 we compare the deleted observations with the observations that were kept into the model to investigate the potential influence of deleting observations with missing information.

[97] The OR is the ratio between two odds (A/B), indicating the probability that an event will occur versus the probability that the event will not occur. The OR is always interpreted in comparison with the reference category. For example, the $OR_{male,P2+P1}$ is the ratio of the odds that a man has P2+P1 versus P1 (man with P2+P1/man with P1) and the odds that a woman has P2+P1 (woman with P2+P1/women with P1). When OR is larger than 1, the probability of odds A is larger than the probability of odds B; when OR is smaller than 1, the probability of odds A is smaller than the probability of odds B; and when OR is 1, the probability of odds A is equal to that of odds B.

Table 8.6. Results of the multinomial logit model with composition of the personal income package as dependent variable (weighted, 2007)

	Wald Chi^2	Significance *p*
N		1598
Global model significance		<0.0001
Independent variables		
Sex	99.7048	<0.0001
Age	124.9969	<0.0001
Occupational status	120.883	<0.0001
Level of education	35.2915	<0.0001
Living situation	99.3008	<.0001
Region of residence	26.013	0.0107
Nagelkerke R^2		0.3857

2.3.2 Interpretation of the model results

Based on the results of the multinomial logit model (Table 8.7), the following conclusions on the factors predicting the composition of the personal old age income package are drawn.

First, sex, age, occupational status, and level of education significantly predict whether one combines a second and first pillar pension (P2+P1) or receives only a first pillar pension (reference category). Overall, the odds of receiving a second and a first pillar pension (versus only a first pillar pension) are larger for men, respondents between 60 and 74 years, elderly with a high occupational status (i.e. salariat) and elderly with an intermediate level of education (OR > 1). Women, elderly aged 75 years and over, elderly that never were in employment and elderly with a low level of education have lower odds on combining a second and first pillar pension (versus receiving only a first pillar pension). This confirms the more vulnerable situation of older women and the oldest elderly.

Second, for the combination of a first and third pillar pension, age, occupational status, level of education and living situation are significant. The odds of combining a first and a third pillar pension (versus only a first pillar pension) are larger for elderly between 60 and 74 years, elderly belonging to the salariat class, elderly with a high level of education, and elderly living with a partner (OR > 1). Sex, however, is not significant in predicting the combination of a first and a third pillar pension.

Thirdly, the receipt of social security benefits (versus a first pillar pension) is significantly predicted by sex, age, and living situation. The odds on receiving social security benefits are larger for men and elderly between 60 and 74 years, compared to women and elderly of 75 years and over. For living situation, however, the odds of receiving social security benefits are smaller for those living with a partner than for singles (OR < 1).

Table 8.7. Results of the multinomial logit model with composition of the personal income package as dependent variable (weighted, 2007)

	P2+P1		P1+P3		SS+other		Wage+other		Only P3		None	
	OR	***P***	**OR**	***p***	**OR**	***P***	**OR**	***p***	**OR**	***p***	**OR**	***p***
Sex (reference: female)												
Male	3.3105	<0.0001	1.2278	0.1707	3.2062	<0.0001	2.8945	<0.0001	0.6099	0.0526	0.2946	<0.0001
Age (reference: 75+)												
60-74	1.7071	0.0114	2.9949	<0.0001	8.5156	<0.0001	6.8387	<0.0001	5.0480	<0.0001	2.6677	<0.0001
Occupational status (reference: no occupation)												
Salariat	2.7093	0.0506	2.4446	0.0036	1.8040	0.3488	1.6959	0.4306	0.2907	0.0031	0.1586	<0.0001
Intermediate	1.1951	0.7255	1.5790	0.1254	1.9709	0.2661	1.6590	0.4416	0.3953	0.0154	0.2325	<0.0001
Working Class	0.5899	0.3165	1.3897	0.2584	2.2651	0.1699	1.0819	0.9060	0.5243	0.0714	0.1479	<0.0001
Level of education (reference: low)												
High	1.8076	0.0896	2.1376	0.0013	1.3067	0.4630	4.2313	0.0006	3.5530	0.0024	0.9957	0.9909
Intermediate	1.7484	0.0397	1.2985	0.1211	1.0462	0.8554	2.3124	0.0133	2.5442	0.0011	0.7917	0.3106
Living situation (reference: single)												
Couple	1.0983	0.6845	1.3653	0.0400	0.5954	0.0212	0.8713	0.6026	7.1086	<0.0001	8.6564	<0.0001
Region (reference: Brussels)												
Flanders	0.8032	0.6407	2.1029	0.0884	1.2433	0.7251	4.2969	0.1735	2.4252	0.4216	0.5035	0.2044
Wallonia	0.3942	0.0563	2.1359	0.0829	1.1144	0.8628	2.3533	0.4284	2.2574	0.4620	0.4303	0.1256

Note: The reference category of the dependent variable is having only a first pillar pension (P1).

Source: Author's calculations based on SHARE wave 2

Fourth, the receipt of a wage seems to be inhibited by sex, age, and level of education. As expected, the odds on receiving a wage (versus only a first pillar pension) are larger for men, respondents between 60 and 74 years, and elderly with an intermediate or a high level of education (OR > 1).

Fifth, all background variables, expect region of residence, are significant in predicting the receipt of only a third pillar pension. The odds of receiving only a third pillar pension compared to receiving only a first pillar pension are larger for elderly between 60 and 74 years, for elderly with an intermediate or high level of education, and for elderly living with a partner (OR > 1). Yet, the odds of receiving only a third pillar pension (versus a first pillar pension) are smaller for men than for women (OR < 1). Similarly, the odds of receiving a third pillar pension (versus a first pillar pension) are smaller for elderly with previous employment than for elderly without an employment history (OR < 1).

Lastly, the odds of having no personal income sources compared to having a first pillar pension are smaller for men than for women (OR < 1). This confirms our hypothesis that women more often have no personal income sources than men. Also the odds of having no personal income sources are larger for elderly living with a partner (OR > 1), which again confirms our previous findings. Overall, this refers to married women that have never worked, and thus are not entitled to any personal income sources. Having worked is a negatively associated with having no personal income sources: respondents with an occupational history (irrespective of status) have smaller odds on having no personal income sources in comparison with respondents without previous employment (OR < 1). Finally, elderly between 60 and 74 years have higher odds on receiving no personal income sources.

Note that this logistic regression model testing the composition of the personal old age income package confirms the vulnerable status of some older groups. The odds of having a more diverse income package (i.e. combining a second and/or third pillar pension with other income sources) versus having a single source income package (only first pillar pension) are overall lower for older women and the oldest elderly. On the other hand, the odds of having no meaningful income sources (i.e. only third pillar pension or no personal income sources) are larger for women than for men. Lastly, region of residence is not significant in explaining differences in the composition of the personal old age income package. This is explained by the fact that income matters (e.g. pensions, social security benefits) are regulated on the federal policy level, and thus account for the older population in all Belgian regions.

2.4 A multivariate regression model explaining the generosity of the personal income package

To explain the level of income the personal old age income package generates (numerical variable), a multivariate regression model was estimated. Sociodemographic and

socioeconomic background variables, as well as the composition of the old age income package, were included in the model as explanatory variables. We first explain the construction of the model, and afterwards discuss the model results.

2.4.1 Construction of the model

The equivalent individual monthly income for personal income sources is the dependent variable in the model. Seven categorical variables are included in the model as explanatory variables. These have been transposed to dummy variables via a reference coding (see Table 8.8).

Table 8.8. Independent variables in the multivariate regression model and their reference category

Variable name	Reference category
Personal income package composition	Only first pillar pension (P1)
Sex	Female
Occupational status	No occupation
Level of education	Low
Living situation	Single
Region of residence	Brussels Capital Region

Based on theoretical assumptions, we have included three interaction effects in the model: an interaction of the level of education and the occupational status, an interaction of sex and occupational status, and an interaction of sex and living situation.

An exploratory linear regression showed a distorting influence of outliers and leverage points (so-called influential values) in the dependent variable and – to a limited extent – problems with the assumed normal distribution of the residuals of the independent variables.[98] More specifically, the distribution of the residuals was right skewed (a heavy tail to the right), and their variance increased with values of the dependent and independent variables. To limit the influence of outliers and leverage points, it was decided to do a robust regression analysis using PROC ROBUSTREG in SAS. Different Box-Cox transformations of the dependant (i.e. the square root and the log) were applied to overcome the violation of the normality assumption, yet none of them did actually

[98] Besides normality and the presence of outliers and leverage points, the Gauss Markov assumptions of regression analysis include the assumption of homoscedasticity (i.e. constant variance in the residuals), linearity (i.e. a linear relationship between the dependent and the independent variables), and multicollinearity (i.e. the existence of correlations between the independent variables in the model). It should be noted that the assumption of linearity does not hold for the categorical variables in the model. For more details on the Gauss Markov assumptions of linear regression analysis, consult Welkenhuysen-Gybels & Loosveldt (2002).

improve the model. 52 Respondents were deleted because of missing, leaving us with a sample of 1640 observations.[99]

The regression analysis was executed in three stages. First, a model with only the dependent variable (level of the equivalent net monthly income from personal income sources) and the most important independent variable (i.e. composition of the income package) was tested. Second, the stratification determinants (i.e. sex, age, occupational status, level of education, living situation, and region) were introduced in the model. Third, the three interaction effects were introduced. For theoretical reasons, variables were not deleted from the model when they were not significant.

Ideally, regression coefficients should be standardised before running the model. According to Welkenhuysen-Gybels and Loosveldt (2002), standardisation facilitates the comparison of parameter estimates between the categories in the model. Yet, when using the PROC ROBUSTREG in SAS, standardised regression coefficients cannot be calculated. This explains why unstandardised regression parameters are presented in the next table.

Overall, all three models are significant at an alpha-level of 0.001. The explained variance is quite low, ranging from 10% in the first model to 19% in the third model (see R^2 in Table 8.9). About one fifth of the variance in the dependent variable is explained by all variables in the complete model. The unstandardised parameter estimates and p-values, indicating the significance of the effects, are presented in Table 8.9.

[99] In appendix 8 we compare the deleted observations with the observations that were kept into the model to investigate the potential influence of deleting observations with missing information.

Table 8.9. Results of the multivariate robust regression model with equivalent net monthly income from the personal income package (in Euro) as the dependent variable (weighted, 2007)

	Model 1		Model 2		Model 3	
	B	***p***	**b**	***p***	**b**	***p***
Intercept	1079	<0.0001	889	<0.0001	890	<0.0001
Income source (reference: P1)						
P2+P1	152	0.0007	74	0.0998	83	0.0584
P1+P3	164	<0.0001	80	0.0088	75	0.0120
SS+other	21	0.6605	26	0.5722	2	0.9654
Wage+other	298	0.0002	246	0.0026	191	0.0091
Only P3	-311	<0.0001	-424	<0.0001	-461	<0.0001
None	-421	<0.0001	-530	<0.0001	-597	<0.0001
Sex (reference: female)						
Male			-144	<0.0001	620	0.0077
Age (reference: 75+)						
60-74			5	0.8497	0	0.9929
Occupational status (reference: no occupation)						
Salariat			107	0.0243	-12	0.8947
Intermediate			-79	0.0731	-80	0.2586
Working class			-8	0.8558	-76	0.2043
Level of education (reference: low)						
High			252	<0.0001	156	0.2297
Intermediate			74	0.0081	-14	0.8329
Living situation (reference: single)						
Couple			203	<0.0001	342	<0.0001
Region (reference: Brussels)						
Flanders			71	0.2952	60	0.3653
Wallonia			119	0.0841	110	0.1038
Interaction effect of sex and occupational status						
Male*Salariat					-583	0.0134
Male*Intermediate					-580	0.0142
Male*Working class					-519	0.0278
Interaction effect of level of education and occupational status						
High*Salariat					232	0.1178
High*Intermediate					-101	0.4984
High*Working class					-35	0.8516
Mid*Salariat					167	0.0929
Mid*Intermediate					76	0.3705
Mid*Working class					97	0.2189
Interaction effect of sex and living situation						
Male*Couple					-329	<0.0001
R^2	0.1011		0.1722		0.1933	
Change R^2			0.0711		0.0211	
AIC	1993		2018		2049	
BIC	2031		2108		2193	

Note: The dependent variable is the equivalent net monthly income from personal income sources. The interaction effects should always be interpreted in relationship with the main effects of the variables in the interaction.

Source: Author's calculations based on SHARE data wave 2

2.4.2 Interpretation of the model results

Most importantly, the multivariate regression model indicates that the composition of the income package is statistically significant in explaining the equivalent net monthly income from personal income sources. Overall, elderly with a more diverse income package have a higher equivalent net monthly income from this income package than elderly with a less diverse income package, even when controlling for background differences in sex, occupational status, level of education, living situation and region of residence (and interactions between these variables).

The effect of the income package composition on the income level is significant for all categories of the income package, except for the combination of social security benefits with other income sources (SS+other). In the third model, which includes the sociodemographic and socioeconomic background variables and the interaction effect, elderly combining a second or third pillar pension with a first pillar pension are predicted to have resp. 83 and 75 Euros more than elderly with only a first pillar pension. In the same model, elderly without personal income sources are predicted to have an income that is 597 Euros lower than that of elderly with only a first pillar pension. This confirms our hypothesis that a more diverse old age income package generates a higher level of protection against the financial dimension of old age dependency.

In the third model, only living situation and the interaction effect of sex and living situation are statistically significant at the 0.05 level. The equivalent net income from personal income sources is significantly higher for women living with partner and for men (irrespective of living situation) than for single women, when controlling for other background differences. Again note that no significant influence of the region of residence is found.

Also note that the inclusion of the interaction effects in the third model does not improve the goodness-of-fit of the model. The R^2 increases with 0.0211 between the second and the third model, but the other goodness-of-fit indicators (AIC and BIC) increase, which implies a reduction in the explanatory power of the model.

3. Additional protection from the asset package

A next step in the analysis of the old age income package involves the inclusion of property and financial assets. Different strategies are at hand to include assets in the old age income package. We can assess the direct contribution from assets via the rental incomes from

secondary residence and the interests from financial assets; we can simulate the potential contribution from assets; and we can assess the prevalence of assets poverty.[100]

In the first section, we describe the asset package in terms of ownership and contribution to the personal income package. In section 3.2, the financial contribution from financial assets and property ownership is investigated. We make a difference between the direct contribution from assets, the potential (simulated) contribution from assets, and the prevalence of asset poverty. In the third section, we examine whether a relationship exists between the personal old age income package and assets, both in terms of ownership and level of income protection. In section 3.4 we investigate which determinants are statistically significant in explaining asset ownership. We present the results from two binary logit models to explain financial asset ownership on the one hand, and property ownership on the other hand. In the last section we investigate the determinants that are decisive in explaining the contribution from asset.

3.1 Description of the asset package

The description of the asset package is threefold. First, we focus on asset ownership: to what extent has the research population access to financial and property assets. Second, the contribution from assets to the personal income package is investigated. A difference is made between the direct contribution via interest from financial assets and rental incomes from secondary residence, and the indirect contribution via a simulation of fictitious annuities and reverse mortgages. Third, we assess the quality of the asset package in terms of asset poverty. To what extent is the asset stock sufficient to buffer periods of financial deprivation?

3.1.1 Financial asset and property ownership

In this first section, we investigate asset ownership, which includes financial assets (bank accounts and other financial products) on the one hand, and property ownership (home ownership and secondary residence) on the other hand. Table 8.10 shows the weighted distribution of the research population by (combinations of) asset ownership.

[100] Details on the simulation of the contribution from financial assets and property ownership, and on the calculation of asset poverty are provided in chapter 7.

Table 8.10. Distribution of the research population by asset ownership (weighted, 2007)

	N	%
Asset ownership		
No assets	24	2
Only financial assets	297	19
Financial assets + property ownership	1249	78
+ home	974	78
+ home + 2nd residence	255	20
+ 2nd residence	20	2
Only property assets	26	2
Total	**1596**	**100**
N missing	35	

Source: Author's calculations based on SHARE data wave 2

Asset ownership is common good among the Belgian elderly population. Only 2% of the research population does not have any asset sources at his/her disposal.[101] The majority of the research population combines financial assets with property ownership (78%). Overall, these are elderly that have financial assets and own a house for living (98%). About 20% of the elderly combining financial assets and property ownership, have both a house for living and a secondary residence. 19% of the research population only has financial assets, while 2% has no access to assets at all. Another 2% of the research population only disposes of property ownership and has no financial assets.

3.1.2 The contribution from financial assets and property

We first investigate the direction contribution from financial assets and property ownership. To recall, this includes the interests from financial assets and the rental incomes from renting out secondary residence. Table 8.11 shows the mean and median equivalent monthly direct contribution from financial assets and property ownership.

On average, financial assets and property ownership contributes 165 Euros per month to the old age income package. However, 50% of the research population receive 28 Euros or

[101] When we compare this to the neighbouring countries of Belgium, we find that asset ownership – and particularly home ownership – is significantly more important in Belgium than in France, the Netherlands and Germany. For example, in Germany about 5% of the elderly population does not have any asset sources at his/her disposal (compared to about 2% in Belgium). In the Netherlands, 45% of the elderly population only has financial assets, compared to 19% of the Belgian elderly population. Lastly, in France about 50% of the elderly population combines financial assets with home ownership, compared to 61% of the Belgian elderly population. More details on assets from a comparative point of view are provided in Verpoorten (2014). The relatively good position of Belgium concerning financial assets, in comparison with other European countries, also is confirmed in the study of Capeau and Pacolet (2009).

less per month from their asset sources. This discrepancy between the mean and the median direct contribution from assets stems from the contribution from secondary residence. The direct contribution from secondary residence is quite high, but only a few elderly have access to this type of revenues. To illustrate, the mean equivalent monthly direct contribution from assets for elderly that combine financial assets with home ownership and secondary property ownership is 449 Euros, compared to 116 Euros for elderly with financial assets and home ownership.

Table 8.11. Mean and median equivalent monthly direct contribution from financial assets and property ownership by asset ownership (weighted, 2007)

	N	Mean	Median
Asset ownership			
No assets	24	0	0
Only financial assets	297	63	10
Financial assets + home	974	116	24
Financial assets + home + 2nd residence	255	449	264
Financial assets + 2nd residence	20	345	134
Only property ownership	26	0	0
Total	**1596**	**165**	**28**

Note: The income differences between the asset package compositions are statistically significant (Kruskal-Wallis Chi^2=238.9326; DF=3: p<0.0001).

Source: Author's calculations based on SHARE data wave 2

Table 8.11 also gives a first indication of the relationship between the asset contribution and asset ownership. The direction contribution from assets is higher for elderly that combine different asset sources, while the contribution is lower for elderly with a lower degree of diversity in their asset package.

Secondly, we investigate the indirect, potential contribution from financial assets and property ownership to the old age income package. For this we draw on the simulation of the asset income, which includes a fictitious annuity from financial assets, a fictitious annuity from secondary residence, and a reverse mortgage from home ownership. Details on the simulation of the potential contribution from financial assets and property ownership are provided in chapter 7. The mean and median simulated equivalent monthly contribution from financial assets and property ownership are shown in Table 8.12.

Table 8.12. Mean and median simulated equivalent monthly contribution from financial assets and property ownership by asset ownership (weighted, 2007)

	N	Mean	Median
Asset ownership			
No assets	24	0	0
Only financial assets	297	303	55
Financial assets + home	974	1358	939
Financial assets + home + 2nd residence	255	3064	2240
Financial assets + 2nd residence	20	2223	1211
Only property ownership	26	1077	726
Total	**1596**	**1442**	**926**

Note: The income differences between the asset package compositions are statistically significant (Kruskal-Wallis Chi^2=679.9325; DF= 4; p<0.0001).

Source: Author's calculations based on SHARE data wave 2

On average, the indirect simulated equivalent monthly contribution from assets is about 1400 Euros per month. However, for 50% of the research population the potential simulated equivalent monthly contribution from assets is lower than 916 Euros per month. The difference between the mean and the median simulated contribution from assets indicates a skewness in the distribution of these assets (cf. infra).

As expected, the potential contribution from assets increases when different asset sources are combined. For example, the mean potential contribution from assets is 303 Euros per month for elderly that only have financial assets, compared to 1358 Euros for elderly combining financial assets and home ownership. Elderly that combine financial assets with home ownership and secondary residence ownership are the best off: the potential contribution from their asset package is about 3000 Euros per month.

Table 8.12 also indicates that the potential contribution from property ownership is larger than that from financial assets. When we consider this more in detail, we find that the average potential contribution from property ownership is about 1200 Euros per month, while the average potential contribution from financial assets is about 450 Euros per month. This stems from the larger monetary value of property ownership in comparison with financial assets. For property owners, property assets on average account for 78% of the total simulated equivalent income from the asset package.

3.1.3 Quality of the asset package

In the last section, we investigate the quality of the asset package. This was operationalised in chapter 7 as the potential of the financial asset stock to overcome short periods of financial deprivation. The asset poverty threshold is set at three times the at-risk-of-poverty threshold. Thus, the assets poverty threshold reflects the financial asset stock that is needed to stay above the at-risk-of-poverty threshold for a period of three months, or to put it differently, to overcome a three-month period of financial deprivation. Consequently, the equivalent asset poverty threshold is set at 2379 Euros. Note that only

the financial asset stock is taken into account, because while financial assets are available for direct consumption, this is not the case for property ownership. About 23% of the research population has an asset stock smaller than 2379 Euros, and thus cannot sufficiently protect themselves against short periods of income deprivation.

3.2 The asset package along the lines of the personal income package

More important than assessing the contribution from financial assets and property ownership, is investigating the contribution of assets along the lines of the personal income package. In the following paragraphs, we focus on the relationship between the personal old age income package and the asset package, both in terms of ownership (3.2.1) and level of protection (3.2.2 and 3.2.3).

3.2.1 Asset ownership versus the personal income package

First, we investigate whether differences in asset ownership are associated with differences in the personal income package. We expect that more diverse personal income packages are related to more diverse asset packages. Table 8.13 shows the distribution of the research population by the composition of their personal income package and their asset ownership. Little differences in the financial asset ownership are found between the personal income clusters. For all personal income packages, more than 90% of the research population has financial assets.

Yet, important differences between the personal income packages appear when property ownership is included. A little more than a quarter of the elderly with only a first pillar pension, resp. elderly with social security benefits, do not have property ownership (resp. 26% and 27%), whereas for the other personal income packages this is between 10% and 15%. Property ownership ranges between 68% and 90% of the elderly population. When the combination of financial assets and property ownership is considered, we see that almost 70% of the elderly with only a first pillar pension, resp. with social security benefits, combines financial assets with some type of property ownership, compared to more than 80% of the research population with other personal income package configurations. In addition, it is striking that 24% of the elderly with a first and second pillar pension combines financial assets with home ownership and secondary residence ownership. And even more remarkable is that the same is found for elderly with only a third pillar pension, which we assume to be older women enjoying the profits of living together with an affluent partner.

However, by and large, Table 8.13 confirms that more diverse personal income packages are related to more diverse asset packages.

Table 8.13. Relative distribution of the research population by personal income package and asset ownership (weighted, 2007)

	Personal income package (%)						
	P1	P2+P1	P1+ P3	SS+ other	Wage+ other	Only P3	None
Asset ownership							
No assets	2	0	0	5	4	0	2
Only financial assets	26	13	15	27	15	10	13
Financial assets + home	61	60	64	50	53	63	67
Financial assets + home + 2nd residence	8	24	19	15	24	27	16
Financial assets + 2nd residence	1	2	1	2	4	0	1
Only property assets	3	1	1	2	0	1	1
Total (N=100%)	**510**	**145**	**450**	**128**	**87**	**107**	**169**

Note: The relationship between the personal income package composition and the asset package composition is statistically significant (Pearson Chi^2= 124.9842; DF=30; p<0.0001).

Source: Author's calculations based on SHARE data wave 2

Second, we assess the distribution of asset ownership along the income distribution based on the equivalent income from personal income sources. We expect that the diversity in asset ownership increases with the level of the personal income package. Table 8.14 shows the asset ownership along the income distribution from personal income sources.

Table 8.14. Relative distribution of the research population by personal income decile and asset ownership (weighted, 2007)

	Personal income decile (%)									
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Asset package										
No assets	4	1	2	1	1	2	2	0	2	1
Only financial assets	18	15	21	23	21	23	22	17	14	10
Financial assets + home	50	63	64	63	65	63	60	63	67	53
Financial assets + home + 2nd residence	27	18	7	12	12	7	13	16	17	31
Financial assets + 2nd residence	1	0	2	0	2	1	0	2	1	4
Only property ownership	1	3	4	1	0	4	1	1	0	0
Total (N)	**162**	**156**	**159**	**215**	**115**	**145**	**160**	**161**	**173**	**149**

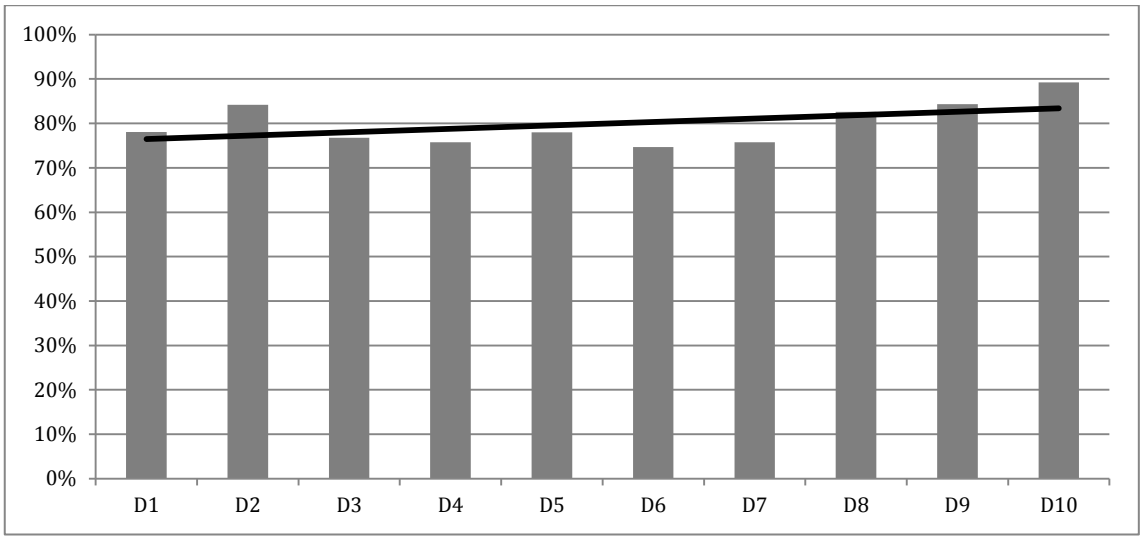
Note: In addition, we investigated the relationship between the generosity of the personal income package and the asset package composition. We found that the more diverse asset packages are significantly related to the more generous personal income packages (Kruskal-Wallis Chi^2=16.7628; DF=5; p=0.0056).

Source: Author's calculations based on SHARE data wave 2

Again, little differences are found between the income deciles regarding financial asset ownership. In all deciles, more than 94% of the research population has financial assets. The situation is different when property ownership is considered (see Figure 8.4). A higher income from personal income sources is associated with a higher degree of property ownership. In the lowest personal income decile 78% of the research population has property ownership, while in the upper personal income decile this holds for 89% of

the research population. The overall trend, illustrated with the black line in Figure 8.4, shows a small, yet steady increase in the proportion of property ownership when moving up the personal income distribution.

Figure 8.4. Relative distribution of the research population by personal income decile and property ownership (weighted, 2007)



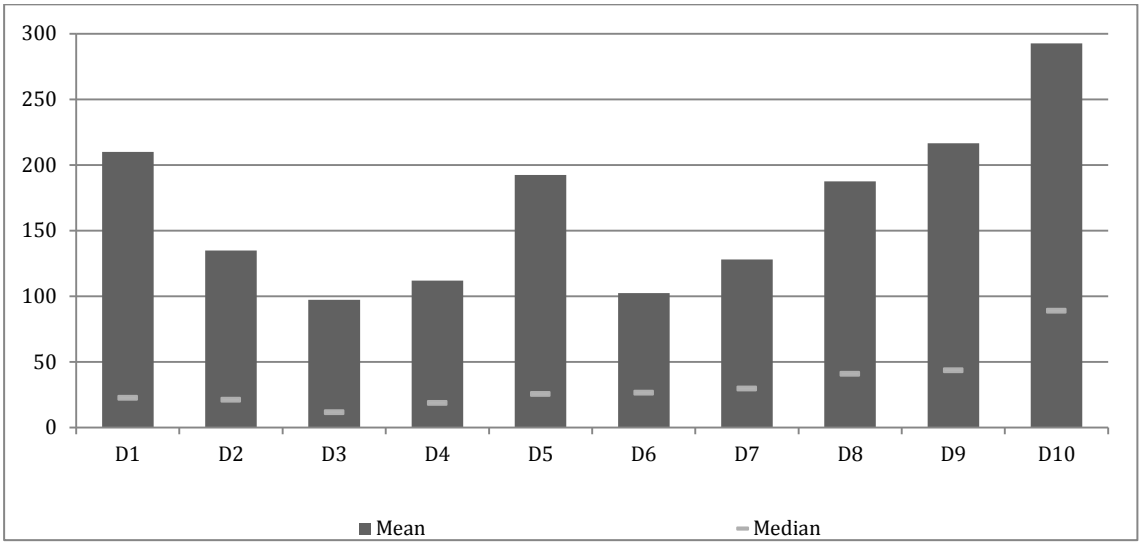
Source: Author's calculations based on SHARE data wave 2

3.2.2 The contribution from assets versus the personal income package

Third, the contribution from assets is assessed along the lines of the personal old age income package. We expect that more generous personal old age income packages go together with more generous asset packages, because elderly with a higher personal income have more savings potential, and are thus expected to have a larger asset stock. More generous asset packages are thus expected to be found at the upper end of the personal income distribution.

Figure 8.5 shows the mean (dark grey bars) and median (pale grey lines) equivalent monthly direct contribution from assets along the personal income distribution. The general trend confirms our expectations: The direct contribution from assets increases when moving up the personal income distribution. Yet, there are important fluctuations between the income deciles, specifically when the mean direct contribution from assets is considered. The results are more stable when the median direct contribution from assets is investigated. This reveals that the differences between the first nine income deciles are relatively small, while the difference between D9 and D10 is quite large: the median direct monthly contribution from assets more than doubles from 43 Euros in D9 to 89 Euros in D10.

Figure 8.5. Mean and median equivalent monthly direct contribution from assets by personal income decile (weighted, 2007)



Source: Author's calculations based on SHARE data wave 2

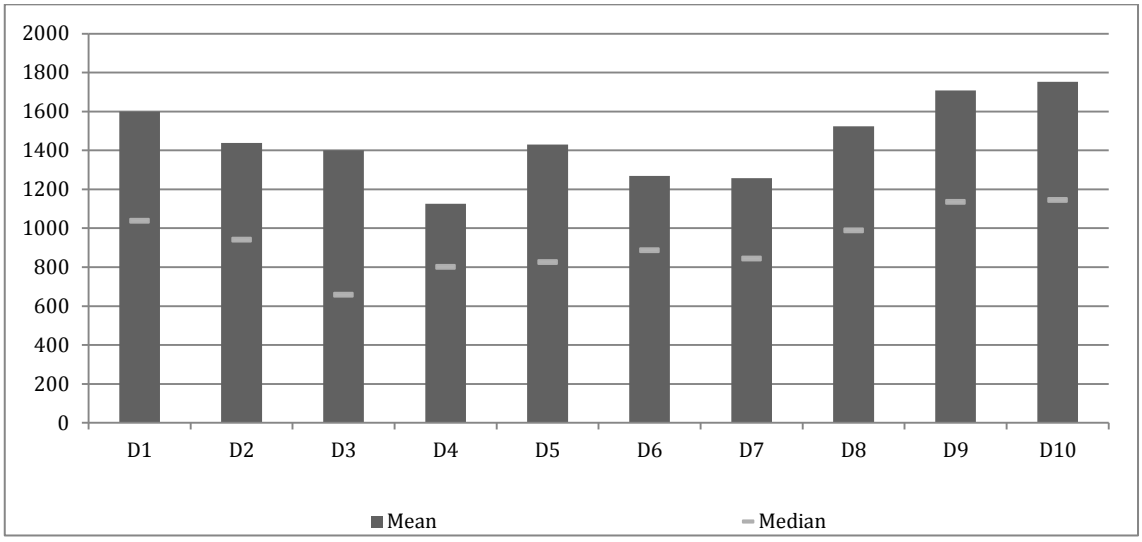
In addition, we calculated the correlation between the direct contribution from assets and the level of the personal income package.[102] The Pearson correlation coefficient is significant (p=0.0469), but the correlation is very weak, almost absent (r=0.05).

Further, Figure 8.6 shows the mean (dark grey bars) and median (pale grey lines) equivalent monthly simulated contribution from assets along the personal income distribution. This simulated contribution includes the fictitious annuities from financial assets and secondary residence, and the reverse mortgage on home ownership. The general trend for both the mean and the median is an increase in the simulated contribution from assets when moving up the personal income distribution. Yet, the fluctuations cannot be neglected. The mean and median simulated contribution from assets in the lowest income decile is only a little bit lower than the mean and median simulated asset contribution in the highest income decile. It is however unclear how this can be explained.[103]

[102] The correlation is assumed to be linear. The Pearson correlation coefficient is calculated using PROC CORR in SAS.

[103] When we asses more in detail the asset ownership along the income distribution we find that an important part of the elderly population in the bottom income decile owns secondary residence and that the potential contribution from secondary residence is largest in the bottom income decile. We cannot explain this, although it might be explained by problems in the registration of asset information in surveys (cf. chapter 7).

Figure 8.6. Mean and median equivalent monthly simulated contribution from assets by personal income decile (weighted, 2007)



Source: Author's calculations based on SHARE data wave 2

Again, we calculated the correlation between the simulated contribution from assets and the level of the personal income package.[104] The correlation is not significant (r=0.0092 and p=0.7163), which reflects the unclear relationship between the personal income decile and the simulated contribution from assets shown in Figure 8.6.

3.2.3 Quality of the asset package versus the personal income package

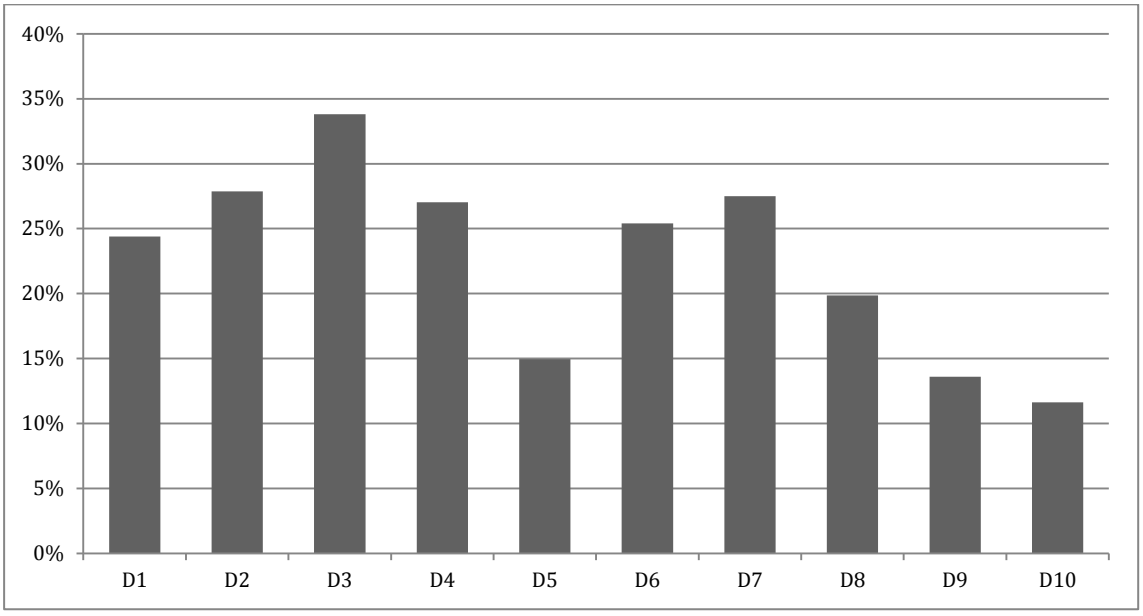
Lastly, we investigate the relationship between the quality of the asset package and the personal income package. We expect that more diverse and more generous personal income packages go together with higher quality asset packages, because elderly with a better personal income package have a higher potential in building a sufficient asset stock.

Figure 8.7 shows the proportion of the research population with an asset stock below the asset poverty threshold along the personal income distribution. The overall trend shows a decrease in asset poverty when moving up the income distribution: a more generous personal income package seem to be associated with higher quality asset packages. In the lowest personal income decile almost a quarter of the research population has an asset stock insufficient to cope with a three-month period of income deprivation, while in the upper income decile this is the case for only 12% of the research population.

[104] The correlation between both variables is assumed to be linear. We computed the Pearson correlation coefficient using PROC CORR in SAS.

Yet, the overall trend hides again important differences between the income deciles. Between the first and the third personal income decile the asset poverty rate increases from 24% to 34%. From D3 to D5 the asset poverty rate decreases in line with the general trend (from 34% to 15%), yet it increases again from D5 to D7 (from 15% to 27%). Between the seventh and tenth income decile, the asset poverty rate decrease steadily from 27% to 12%. No explanations are found for these fluctuations in the asset poverty rate.

Figure 8.7. Proportion of the research population with an asset stock below the asset poverty threshold by personal income decile (weighted, 2007)



Source: Author's calculations based on SHARE data wave 2

3.3 The asset package: Tracing vulnerable groups

In this section, we investigate the relationship between the asset package, in terms of composition and contribution, and the main stratification determinants, like sex, level of education and living situation to trace vulnerable groups of elderly.

First, Table 8.15 shows the relative distribution of the research population by asset ownership and by sex, age, occupational status, level of education and living situation. This largely confirms the findings from section 2.2. Women, the oldest elderly, elderly with a low occupational status, resp. level of education, and single living elderly are in a more vulnerable position. They have a lower degree of diversity in their asset package and more often only have access to financial assets. Elderly that only have financial assets overall are single-living women with a relatively low socioeconomic status (resp. a low occupational status and/or a low level of education). Elderly that combine financial assets with home ownership and secondary residence ownership overall are younger elderly (between 60

and 74 years) with a high socioeconomic status, that live together with a partner. The profile of elderly that combine financial assets with home ownership is less pronounced, but we do find an overrepresentation of elderly living with a partner in this group.

Table 8.15. Relative distribution of the research population by asset ownership and by sex, age, occupational status, level of education and living situation (weighted, 2007)

	Asset ownership							
%	No assets	Financial assets	Financial assets + home	Financial assets + home + 2nd residence	Financial assets + 2nd residence	Only property ownership	**Total (N=100%)**	**Significance *p***
Sex								
Male	1	16	62	18	1	1	712	0.0443
Female	2	21	60	14	1	2	884	
Age								
60-74	1	14	63	19	1	1	1034	<0.0001
75+	2	27	57	10	1	3	562	
Occupational status								
Salariat	0	17	58	23	2	0	538	<0.0001
Intermediate	2	16	62	17	2	1	368	
Working class	2	25	60	8	1	3	451	
None	1	14	71	13	0	1	176	
Education								
High	1	15	57	24	3	0	346	<0.0001
Intermediate	1	17	62	17	1	1	729	
Low	2	23	63	9	0	3	506	
Living situation								
Couple	0	12	65	20	1	1	1028	<0.0001
Single	4	31	53	8	1	2	568	
Total	**2**	**19**	**61**	**16**	**1**	**2**	**1596**	

Source: Author's calculations based on SHARE wave 2

Second, Table 8.16 shows the mean and median direct and simulated equivalent monthly contribution from financial assets and property ownership by the main stratification determinants. Note that the findings based on the direct and the simulated contribution from asset are not always in the same direction, which can be attributed to the simulation method we used (cf. chapter 7).

When we consider the direct contribution from assets, the more vulnerable position of older women, the oldest elderly, elderly with a low occupational status, resp. low level of education, and single living elderly is confirmed. This is explained largely by the lower asset accumulation potential of these groups. For example, during their active career men (or persons with a higher occupational status, resp. level of education) overall have higher wages than women (or persons with a lower occupational status, resp. level of education), and thus have a higher asset accumulation potential than women.

Table 8.16. Mean and median direct and simulated equivalent monthly contribution from asset sources by sex, age, occupational status, level of education and living situation (weighted, 2007)

	Direct contribution			Simulated contribution		
	Mean	**Median**	***p***	**Mean**	**Median**	***p***
Sex						
Male	191	37	0.0128	1448	927	0.2592
Female	144	24		1436	923	
Age						
60-74	182	36	<0.0001	1206	876	<0.0001
75+	132	20		1878	1098	
Occupational status						
Salariat	259	69	<0.0001	1752	1145	<0.0001
Intermediate	163	33		1575	960	
Working class	69	13		929	672	
None	127	20		1482	1027	
Education						
High	273	83	<0.0001	1865	1210	<0.0001
Intermediate	173	37		1459	973	
Low	76	12		1117	702	
Living situation						
Couple	178	38	<0.0001	1331	912	0.6675
Single	140	19		1649	958	
Total	**165**	**28**		**1442**	**926**	

Source: Author's calculations based on SHARE wave 2

When we consider the potential simulated contribution from financial assets and property ownership, the more vulnerable situation of elderly with a low occupational status, resp. level of education is confirmed. Yet, this is not the case for older women, the oldest elderly and single living elderly. This is explained by the simulation method we used to compute the potential asset contribution (cf. chapter 7). The simulation takes account of the remaining life expectancy: a larger remaining life expectancy yields a smaller potential asset contribution. Individuals with a higher age have a shorter remaining life expectancy

and thus gain more from assets than younger individuals. This also is the case for women, that overall have a higher remaining life expectancy than men, and thus have a lower potential income from assets. The more favourable asset contribution for singles is explained by the fact that the asset stock is not shared with a partner, as is the case in couples, and thus the potential income from assets is larger.

3.4 Two binary logit models explaining asset ownership

In this section, we investigate which determinants are statistically significant in explaining asset ownership. Because financial asset ownership is quite widespread among the research population, and we do not want this to cloud the findings regarding property ownership, we estimate to separate models: one for financial asset ownership, and one for property ownership. Both are categorical binary variables (ownership or not), which explains the choice for a binary logistic regression model. In section 3.4.1 we explain the construction of the models, and in section 3.4.2 we focus on the results of the logit models.

3.4.1 Construction of the models

The dependent variable in the first model (referred to as LM1) is financial asset ownership, a categorical binary variable. The reference category is not having financial assets. The dependent variable in the second model (referred to as LM2) is property ownership, a categorical binary variable. The reference category is not having property.

Both models include the same independent variables (see Table 8.17). A first group of independent variables refers to the personal old age income package: the composition of the personal old age income package, and the level of the personal old age income package (equivalent net monthly income from personal income sources). To simplify the interpretation of the results, we include the income level as a categorical variable with five categories based on the income quintiles. A second group of independent variables refers to the stratification determinants, that are included as controlling variables: sex, age, occupational status, level of education, living situation and region of residence.

Table 8.17. Independent variables in the logit models testing asset ownership and their reference category

Variable name	Reference category
Personal income package composition	Only first pillar pension (P1)
Level of personal income	Q1 (760 Euros)
Sex	Female
Age	75+
Occupational status	No occupation
Level of education	Low
Living situation	Single
Region of residence	Brussels Capital Region

In both models, 162 observations with missing values on the explanatory or dependent variables were removed, leaving a sample of 1530 observations. An examination of the logistic regression assumptions indicated no violations on the multicollinearity and linearity of both models. A limited number of outliers were detected, however, it was decided not to delete them from the models. PROC LOGISTIC was used to estimate the models in SAS.

The global model statistics of both logistic regression models are presented in table 8.18. LM1, explaining the financial asset ownership, is overall significant (p<0.0001). At the global level, only occupational status and living situation are statistically significant at the 0.05-level. The explanatory power of LM1 is rather low, with a Nagelkerke R^2 of 0.1804: 18% of the variance in the dependent variable is explained by the variables in the logit model.

Table 8.18. Overview of the global model statistics of the logit regression models with financial asset ownership (LM1) and property ownership (LM2) as dependent variables (weighted, 2007)

	LM1 (financial assets)		LM2 (property assets)	
	Wald Chi^2	Significance p	Wald Chi^2	Significance p
Global model significance		<0.0001		<0.0001
Independent variables				
Personal income package	10.3152	0.1124	16.9526	0.0095
Personal income level	2.0143	0.7332	6.0905	0.1956
Sex	0.1038	0.7476	1.0945	0.2957
Age	0.6791	0.4099	8.2335	0.0041
Occupational status	11.2258	0.0106	14.4462	0.0024
Level of education	1.2712	0.5297	1.6398	0.4405
Living situation	7.2353	0.0072	38.6565	<0.0001
Region of residence	3.7675	0.1520	8.2087	0.0165
Nagelkerke R^2		0.1804		0.1473

LM2, explaining property ownership, also is overall significant (p<0.0001). Personal income package composition, age, occupational status, living situation and region are

significant at the 0.05-level. Again, the explanatory power of LM2 is rather low. According to the Nagelkerke R^2, the logit model explains only 15% of the variance in the dependent variable (max-rescaled R^2=0.1473). The odds ratios (OR) and the p-values, indicating the significance of the individual effects, of LM1 and LM2 are presented in Table 8.19.

Table 8.19. Results of the binary logit models with financial asset ownership (LM1) and property ownership (LM2) as dependent variables (weighted, 2007)

	LM1 (financial assets)		LM2 (property assets)	
	Odds ratio	***P***	**Odds ratio**	***p***
Personal income package (reference: P1)				
P2+P1	3.9406	0.2143	1.7513	0.0696
P1+P3	3.4196	0.0184	1.4763	0.0411
SS+other	0.8690	0.7855	0.6051	0.0501
Wage+other	0.5851	0.4224	0.9320	0.8383
Only P3	4.2772	0.2035	1.5316	0.2446
None	1.4478	0.5912	0.9034	0.7211
Personal income level (reference: <760 Euros)				
760-999	1.3516	0.5085	0.8430	0.4336
1000-1189	1.0887	0.8536	0.8125	0.3890
1190-1571	1.8259	0.2581	0.9263	0.7482
≥1572	1.7743	0.3842	1.4557	0.1758
Sex (reference: female)				
Male	1.1231	0.7476	1.1838	0.2957
Age (reference: 75+)				
60-74	1.3482	0.4099	1.5694	0.0041
Occupational status (reference: no occupation)				
Salariat	1.1876	0.8436	0.4211	0.0046
Intermediate	0.4017	0.1909	0.5621	0.0447
Working class	0.2150	0.0215	0.3780	0.0004
Level of education (reference: low)				
High	1.7135	0.4778	1.3820	0.2049
Intermediate	0.8126	0.5545	1.0907	0.6111
Living situation (reference: single)				
Couple	2.6967	0.0072	2.6582	<0.0001
Region (reference: Brussels)				
Flanders	0.0000	0.9902	2.6618	0.0044
Wallonia	0.0000	0.9898	2.3449	0.0143

Note: The reference category of the dependent variable in LM1 is not having financial assets. In LM2 the reference category is not having property.

Source: Author's calculations based on SHARE wave 2

3.4.2 Interpretation of the results in the logit models

Based on the results of the logit models, presented in Table 8.19, the following conclusions are drawn on the variables explaining financial asset and property ownership.

Regarding financial asset ownership (LM1), little statistically significant determinants are found. The generosity of the personal income package has no significant role in explaining whether one has financial assets or not. Further, only respondents having a first and third

pillar pension are significantly different for respondents with only a first pillar pension on financial asset ownership. The odds of having financial assets are larger for elderly with a first and third pillar pension than for elderly with only a first pillar pension (OR > 1). Among the stratification determinants, only having a low occupational status (working class) and living with a partner proof to be statistically significant. The odds of having financial assets are significantly smaller for elderly with a low occupational status than for elderly without an occupational status (OR < 1), which is explained by the fact that elderly without previous employment probably benefit from living together with a partner that has financial assets. Similarly, the odds of having financial assets are significantly larger for elderly living with a partner than for single living elderly (OR > 1).

Regarding property ownership (LM2), we see that the odds of having property ownership are significantly larger for elderly combining first and third pillar pensions than for elderly with only a first pillar pension (OR > 1). Elderly receiving social security benefits, however, have smaller odds on having property ownership than elderly with a first pillar pension (OR < 1). Among the stratification determinants, elderly between 60 and 74 years, elderly living with a partner, and elderly living in Flanders or Wallonia have significantly higher odds on having property than elderly older than 75 years, single living elderly, and elderly living in Brussels (OR > 1). The odds ratio's for occupational status (salariat and working class) are also statistically significant at the 0.05 level, but in the opposite direction that what would be expected. Elderly with a high, resp. low occupational status have lower odds on property ownership than elderly without previous employment. A clear explanation for this was not found.

3.5 Multivariate regression models explaining the asset contribution

To investigate whether the personal income package plays a significant role in explaining the differences in the contribution from financial assets and property ownership, we have estimated two multivariate regression models on the direct and the simulated asset contribution. In section 3.5.1 we explain the construction of the models, and in section 3.5.2 we discuss the model results.

3.5.1 Construction of the models

The dependent variable in the first model (MM1) refers to the direct contribution from financial assets and property. This includes the interests from financial assets, and the rental incomes from secondary residence. The second model (MM2) focuses on the simulated contribution from financial assets and property ownership as the dependent variable. This includes the fictitious annuities from financial assets and secondary residence and the reverse mortgage from home ownership. Because both dependent

variables are continuous variables, we have estimated two multivariate regression models.

We included eight independent variables in MM1 and MM2: two variables referring to the personal old age income package (composition and income level) and six sociodemographic and socioeconomic background variables (sex, age, occupational status, level of education, living situation and region of residence). These categorical variables are transposed to dummy variables via a reference coding (cf. supra: Table 8.17).

An exploratory linear regression model showed a limited distorting influence of outliers and leverage points, and limited problems with the assumed normal distribution of the residuals (i.e. skewed at the tails of the distribution). Because the distortion of normality was very limited, the distribution was considered to be normal. Further, no violations were found on the other Gauss-Markov assumptions of linear regression models (cf. supra). To limit the influence of outliers and leverage points, we decided to do a robust regression analysis using PROC ROBUSTREG in SAS, similar to the approach in section 0. MM1, testing the direct contribution from assets, includes 1456 respondents; 236 respondents were deleted because of missings on the dependent or the independent variables.[105] In MM2, testing the simulated contribution from assets, 184 respondents were deleted because of missing information on one of the variables in the model; MM2 thus includes 1508 observations.[106]

The regression analysis was conducted in two stages. In the first stage, the variables on the personal income package were included, and in the second stage, the background variables were included. Variables were not removed from the model when they were not significant.

In the model testing the direct contribution from assets (MM1), the explanatory power of the independent variables is almost negligible. When only the personal income package variables are included, less than 1% of the variance in the dependent variable is explained in MM1 (R^2=0.0086). After the inclusion of the background determinants, the explained variance in MM1 increases a little bit (R^2=0.0294). This is also the case for the model testing the simulated asset contribution (MM2). In the model including only personal income package variables about 2% of the variance in the dependent variable is explained by the model (R^2=0.0249); adding the background variables slightly increases the explanatory power of the model (R^2=0.0684). The unstandardized regression parameters (b) and the p-values, indicating whether the effects are statistically significant, of both models are presented in Table 8.20.

[105] In the model testing the direct contribution from assets, respondents without assets and without rental incomes from secondary property are not included.
[106] In Appendix 8, we give some insights in the observations that are deleted because of missing information on one of the variables in both models (MM1 and MM2).

Table 8.20. Results of the multivariate robust regression models with direct (MM1) and simulated (MM2) equivalent monthly contribution from assets (in Euros) as dependant variable (weighted, 2007)

	MM1 (direct contribution)				MM2 (simulated contribution)			
	Model 1		Model 2		Model 1		Model 2	
	b	***P***	**b**	***p***	**b**	***p***	**b**	***p***
Intercept	17	<0.0001	6	0.4515	946	<0.0001	746	<0.0001
Personal income package (reference: P1)								
P2+P1	13	0.0109	9	0.0868	386	<0.0001	297	0.0003
P1+P3	10	0.0007	9	0.0085	184	0.0018	175	0.0031
SS+other	5	0.3113	4	0.4336	-123	0.1599	-39	0.6524
Wage+other	-1	0.8692	-8	0.2057	136	0.1888	75	0.4607
Only P3	8	0.1175	2	0.6657	137	0.1378	147	0.1135
None	13	0.0038	11	0.0183	106	0.1832	92	0.2733
Personal income level (reference: < 760 Euros)								
760-999	2	0.6085	4	0.2558	-169	0.0212	-125	0.0784
1000-1189	8	0.0599	9	0.0374	-134	0.0914	-134	0.0769
1190-1571	10	0.0158	10	0.0140	-133	0.0788	-130	0.0758
≥1572	14	0.0006	8	0.0475	110	0.1412	60	0.4287
Sex (reference: female)								
Male			1	0.8126			2	0.9681
Age (reference: 75+)								
60-74			4	0.2261			-228	<0.0001
Occupational status (reference: no occupation)								
Salariat			0	0.9554			-76	0.3520
Intermediate			4	0.4158			-94	0.2475
Working class			-3	0.4555			-257	0.0006
Level of education (reference: low)								
High			25	<0.0001			375	<0.0001
Intermediate			10	0.0012			198	0.0001
Living situation (reference: single)								
Couple			5	0.1399			-32	0.5272
Region (reference: Brussels)								
Flanders			7	0.2773			445	0.0001
Wallonia			-10	0.1388			181	0.1187

Note: In MM1 the dependent variable is the direct contribution from assets; in MM2 the dependent variable is the simulated contribution from assets.

Source: Author's calculations based on SHARE wave 2

3.5.2 Interpretation of the results in the multivariate regression models

First, we focus on the multivariate regression model explaining the direct contribution from assets (MM1). Although the explanatory power of the model is relatively small (cf. supra), we do find some interesting - yet small - effects. Elderly combining a second or third pillar pension with a first pillar pension have significantly larger direct contributions from their assets than elderly that only have a first pillar pension. Remarkably this also holds for elderly without personal income sources, but we expect that this concerns elderly living with a more affluent partner that profit from the sharing of assets within the household. Further, we find that the direct contribution from assets is significantly larger

for elderly in the upper income quintiles, with an equivalent monthly income from personal sources above 1190 Euros per month, than for elderly in the bottom income quintile (with an equivalent monthly income from personal sources below 760 Euros per month). When controlling for differences in the sociodemographic and socioeconomic background of the research population, these effects persist, apart from the effect of combining a first and second pillar pension. Both findings confirm that a more diverse and a more generous personal income package goes together with a more generous contribution from the asset package, although we must admit that the differences are quite small.

The effects of the stratification determinants overall are not significant in MM1. The more vulnerable situation of older women and the oldest elderly is not confirmed when we look at the direct contribution from financial assets and secondary residence. We expect that the more vulnerable situation of women partly is compensated by the fact that assets are shared within the household. For the oldest elderly, the ongoing assets accumulation during the retirement period could be an explanation why they do not differ significantly from their younger counterparts.

Secondly, we look at the multivariate regression model including the simulated potential contribution from financial assets and property ownership as the dependent variable (MM2). Concerning the effect of the personal income package, we find that, when controlling for background differences, only elderly combining a second or third pillar pension with a first pillar pension have a significantly larger simulated contribution from assets than elderly with only a first pillar pension (a difference of resp. 297 and 175 Euros per month).

Again, the more vulnerable situation of older women and the oldest elderly is not confirmed. No significant difference is found between men and women, and for age the simulated contribution from assets is significantly larger for the research population older than 75 years than for those between 60 and 74 years. This is explained by the account that is given to the remaining life expectancy in the simulation of the potential contribution from financial assets and property ownership (cf. supra).

4. Combining personal income and asset sources in the extended income package

The last section in this chapter focuses on the combination of personal income sources and asset sources into the extended income package, and an evaluation of the overall level of income protection derived from this. We make a difference between the extended old age income package that includes the direct income from asset sources (i.e. interest from financial assets and rental incomes from secondary residence), and the extended old age income package that includes the indirect, simulated income from asset sources (i.e. the reverse mortgage from home ownership, and the fictitious annuities from financial assets

and secondary residence). In doing so, account is given to the returns of scale that arise from living with a partner.

In section 4.1 we discuss the generosity of the extended income package.[107] We trace the existence of vulnerable groups in section 4.2, and assess whether including asset sources in the extended income package reduces their income vulnerability. In section 4.3 the quality of the extended income package is investigated. We focus on the income distribution to investigate whether the inclusion of assets in the extended old age income package changes the income distribution. Feedback information on the quality of the personal income package is provided to fully grasp the (possible) contribution from asset sources in the old age income package.

4.1 The generosity of the extended income package

Table 8.21 gives the mean and median total equivalent income from the extended old age income package. We distinguish the contribution from personal income sources and from asset sources (resp. financial assets, secondary residence and home ownership). Further, we make a difference between the available and the simulated income from the extended income package. This indicates the (potential) protection against the financial dimension of old age dependency the elderly Belgian population enjoys.

Table 8.21. Mean and median available and simulated equivalent monthly income from the extended income package by income source (weighted, 2007)

	Available income		Simulated income	
Source	**Mean**	**Median**	**Mean**	**Median**
Personal income sources	1298	1067	1298	1067
Asset sources	160	101	1436	1055
Financial assets	120	85	438	268
Secondary residence	40	16	218	101
Home ownership	-	-	779	686
Total	**1458**	**1167**	**2734**	**2122**

Note: The available income includes the interest from financial assets and the rental incomes from secondary residence. Home ownership is not included in the available income (indicated with -). The simulated income includes the simulated reverse mortgage from home ownership, and the fictitious annuities from financial assets and secondary residence.

Source: Author's calculations based on SHARE wave 2

When we look at the available income from the extended income package, we find that on average the Belgian elderly population disposes of 1458 Euros per month. An important part of the population however has a lower income: the median equivalent monthly income from the extended old age income package is 1167 Euros per month. Asset sources

[107] In this section, the analyses are limited to the research population without missing information on one of the covariates (unweighted N=1574).

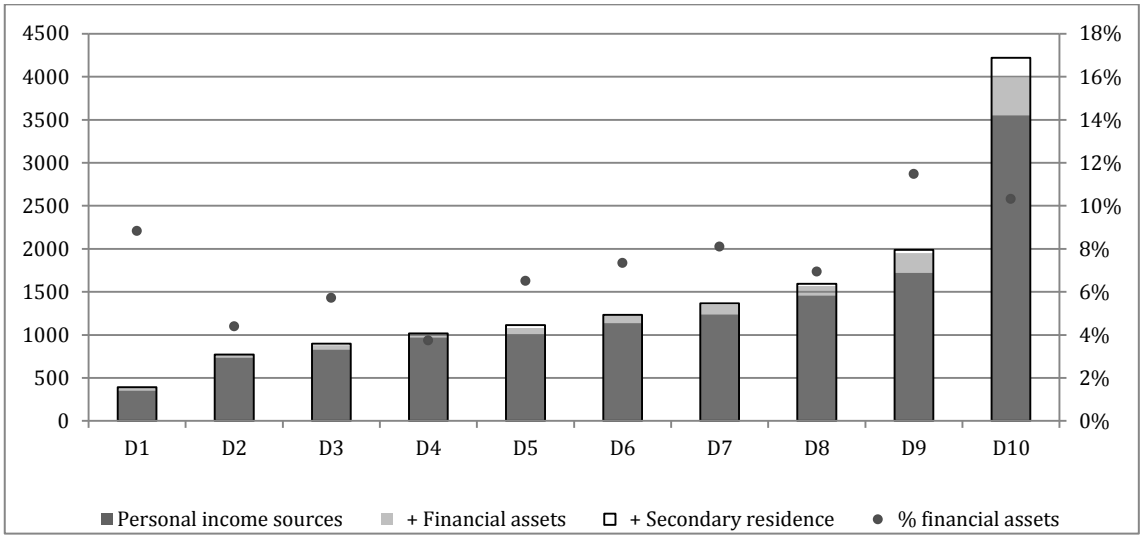
contribute on average 160 Euros per month to the extended income package (about 11%); the bulk of this are interests from financial assets (on average 120 Euros). Rental incomes from secondary residence account for only 40 Euros of the average income from the extended income package. An important point not to be overlooked is the fact that only a minority of the research population has access to rental incomes from secondary residence (cf. section 3.1.1).

When we consider the simulated income from the extended old age income package, we find that the average simulated equivalent income from the extended income package is 2734 Euros per month (median: 2122 Euros per month). Assets contribute importantly to the extended old age income package. The average contribution from assets is even larger than the average contribution from personal income sources (resp. 1436 Euros vs. 1298 Euros). Personal income sources account for 47% of the overall extended income package. The bulk of the asset contribution stems from the simulated reverse mortgage on home ownership, that on average contributes almost 800 Euros per month. This is about 28% of the extended old age income package. This illustrates the important income potential that lies in home ownership for the Belgian elderly population. Also, the decumulation of financial assets could have an important contribution to the level of income protection enjoyed by the elderly population.

In addition, we explore the differences in income protection provided by the extended income package. Figure 8.8 shows the mean available equivalent monthly income from the extended old age income package by income decile[108]. We distinguish the contribution from personal income sources (dark grey bars), financial asset interests (pale grey bars) and secondary residence rental incomes (white bars). The relative contribute from financial asset interest in each income decile is indicated with the dark grey dots. Because the relative contribution of rental incomes from secondary residence is very small, we do not include it in the figure.

[108] The income decile distribution is based on the available income from the extended income package.

Figure 8.8. Mean available equivalent monthly income from the extended income package, by income source and income decile (weighted, 2007)

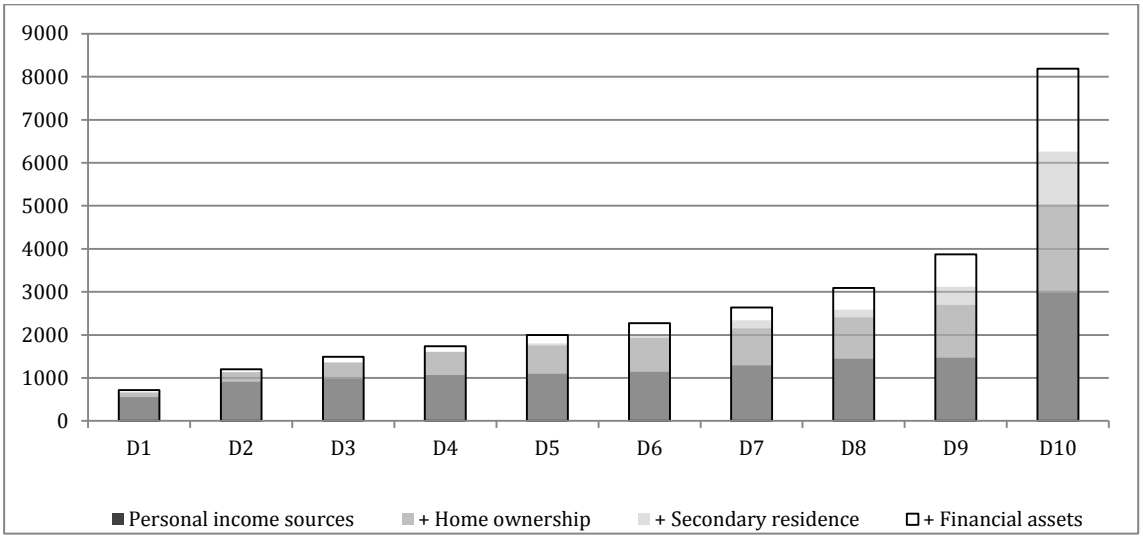


Source: Author's calculations based on SHARE wave 2

The contribution from financial assets to the extended income package increases in absolute terms when moving up the income distribution (indicated with the dark grey dots). In the first income decile (D1), financial asset interests contribute on average 35 Euros per month, while in D10 financial asset interests contribute more than 400 Euros per month. In relative terms, this increasing trend is, although less pronounced, also showing. In the lower deciles financial assets account for 4% to 6% of the total available income from the extended income package, while in the upper deciles financial assets account for 8% to 11% of the total available income. The income distribution shows to be right skewed, with a quite important difference in the mean income between D9 and D10.

In Figure 8.9, we consider the mean simulated income from the extended income package by the income decile distribution (based on the simulated extended income package). Again, we distinguish the contribution of personal income sources (dark grey bars), home ownership via reverse mortgage (mid grey bars), and the fictitious annuities from secondary residence (pale grey bars) and financial assets (white bars). In addition, Figure 8.10 shows the relative contribution of the different sources in the total income from the extended income package in each income decile.

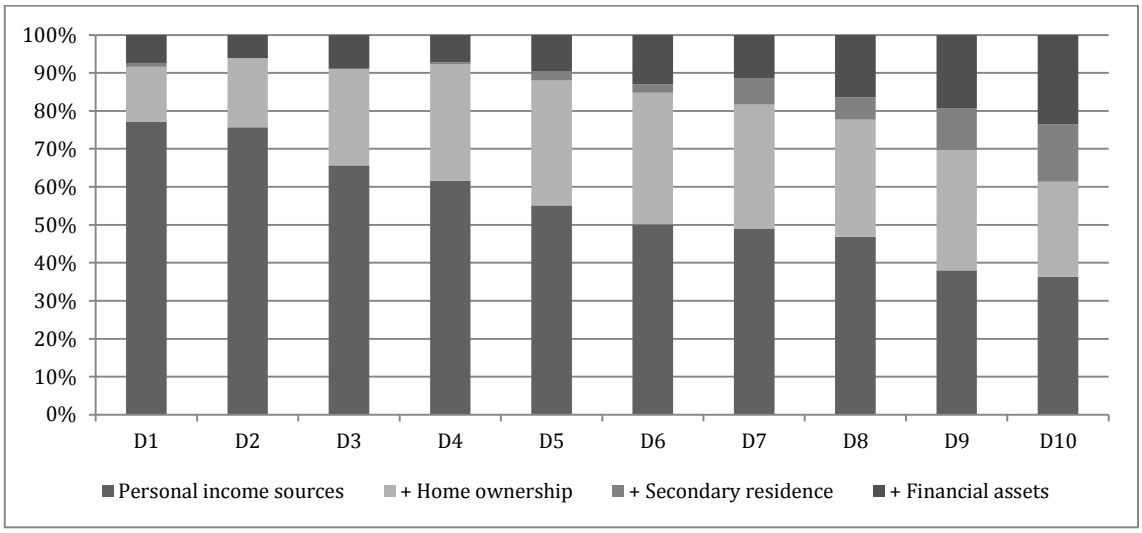
Figure 8.9. Mean simulated equivalent monthly income from the extended income package, by income source and income decile (weighted, 2007)



Source: Author's calculations based on SHARE wave 2

The overall average simulated income distribution based on the extended income package shows to be right skewed. This indicates that the income distribution favours the higher income groups. This resembles the distribution shown in Figure 8.8. The income from personal income sources increases from about 550 Euros in D1 to almost 3000 Euros in D10. Further, home ownership contributes to the extended income package in all income deciles, but its contribution increases in absolute and relative terms when moving up the income distribution. In the bottom income decile, a reverse mortgage from home ownership could contribute about 100 Euros per month, while in the upper income decile this increases to more than 2000 Euros. In relative terms, the share of the reverse mortgage from home ownership increases from 15% in D1 to 25% in D10. Similar trends are found for the simulated contribution of financial assets and secondary residence. Both in absolute and in relative terms, the contribution of these income sources increases when moving up the income distribution. This confirms that elderly with a generous income from personal income sources, enjoy more from assets than elderly with a less generous personal income package.

Figure 8.10. Relative composition of the simulated equivalent monthly income from the extended income package, by income source and income decile (weighted, 2007)



Source: Author's calculations based on SHARE wave 2

4.2 Tracing vulnerable groups

When we look at the differences among the elderly population, our earlier findings on vulnerable groups are confirmed (see Table 8.22). The available income from the extended old age income package favours men, younger age groups, elderly with a higher occupational status or a higher level of education, and elderly living with a partner. Women, the oldest elderly, singles, and low-status elderly are found to be more vulnerable.

However, this changes somewhat when we look at the simulated income from the extended old age income package. The more vulnerable income position of the oldest elderly and of singles disappears when the potential income from assets is added to their personal old age income package. This is the result of the simulation and how it takes account of age and living situation (see chapter 7). Regarding age, the simulation is based on the remaining life span. This is shorter for older persons than for younger persons. Thus, for older persons the asset stock is spent over a short time span, resulting in a higher simulated contribution. For living situation, the simulation assumes an equal distribution of the asset stock over both partners, favouring singles over couples.

Table 8.22. Mean and median direct and simulated equivalent monthly contribution from the extended income package by sex, age, occupational status, level of education and living situation (weighted, 2007)

	Direct total income			Simulated total income		
	Mean	**Median**	***p***	**Mean**	**Median**	***p***
Sex						
Male	1580	1221	0.0031	2839	2165	0.0530
Female	1360	1125		2649	2087	
Age						
60-74	1579	1220	<0.0001	2598	2078	0.0353
75+	1227	1088		2993	2216	
Occupational status						
Salariat	1872	1485	<0.0001	3383	2651	<0.0001
Intermediate	1435	1101		2827	2106	
Working class	1135	1061		1992	1752	
None	1105	1011		2472	2019	
Education						
High	2029	1625	<0.0001	3626	2903	<0.0001
Intermediate	1415	1156		2697	2153	
Low	1129	1006		2171	1722	
Living situation						
Couple	1552	1220	<0.0001	2704	2124	0.1858
Single	1280	1096		2791	2117	
Total	**1458**	**1167**		**2734**	**2122**	

Source: Author's calculations based on SHARE wave 2

4.3 Assessing the quality of the extended income package

To assess the quality of the extended income package, the focus is twofold. On the one hand, the at-risk-of-poverty rate of the research population is calculated to investigate whether including assets in the income package contributes to reducing the old age at-risk-of-poverty rate. On the other hand, the (in)equality of the income distribution is assessed. In both cases, we link this to the quality of the personal old age income package discussed in an earlier section of this chapter. In this way we aim to assess whether including assets in the extended old age income package induces the quality of the income protection enjoyed by the Belgian elderly population.

4.3.1 Protection against old age poverty

In this section, we investigate the protection the extended old age income package provides against old age poverty. We distinguish between the direct available income and the simulated potential income from the extended old age income package. Further, we use two different poverty thresholds. We use the EU-SILC adjusted poverty threshold of 793 Euros (60% of the EU-SILC adjusted median income from personal income sources). To recall, this poverty threshold reflects the income situation of the entire population (not

limited to the elderly population). The poverty threshold does not take account of the income from asset sources, and thus is not completely relative. However, according to Brandolini, Magri, and Smeeding (2010, p. 275), when we change the poverty thresholds, differences in the at-risk-of-poverty rate "would reflect both the use of the different indicator and the shift of the poverty line.". Therefore, the poverty threshold is not recalculated.

As a compensation, we also use age-specific, fully relative poverty thresholds, that reflect 60% of the median equivalent monthly income from personal income sources (before the inclusion of assets), and 60% of the median equivalent monthly income from the extended old age income package (after the inclusion of assets) to assess the quality of the income protection provided by the extended old age income package.

The at-risk-of-poverty rate based on the EU-SILC adjusted poverty threshold

Table 8.23 shows the at-risk-of-poverty rate before and after the inclusion of assets in the income package. In the extended income package, a difference is made between the at-risk-of-poverty rate based on the available income, and on the simulated income. The difference between the at-risk-of-poverty rate before and after assets is shown in the Δ columns.

Before the inclusion of assets in the old age income package, the overall at-risk-of-poverty rate is 21%. About one fifth of the elderly population has an income from personal income sources lower than 793 Euros per month. As expected, the poverty rate decreases when asset sources are included in the extended income package. This decrease is larger when the simulated income is considered than when the available income is considered, which is obvious because the contribution of the first is larger than that of the last (cf. supra). When the available income from assets is added to the extended old age income package, the overall at-risk-of-poverty rate decreases with about 5%, from 21% before assets to 16% after assets. When we add the simulated income from assets, the overall at-risk-of-poverty rate decreases with 16%, from 21% before assets to 5% after the inclusion of the simulated asset contribution.

Table 8.23. EU-SILC at-risk-of-poverty rate before and after assets by sex, age, occupational status, level of education and living situation (weighted, 2007)

	Poverty rate	Poverty rate after assets (%)			
	before assets (%)	Direct	Δ	Simulated	Δ
Sex					
Male	19	14	-6	3	-16
Female	22	17	-5	6	-16
Age					
60-74	20	15	-5	5	-15
75+	22	18	-4	5	-18
Occupational status					
Salariat	14	8	-5	3	-11
Intermediate	28	20	-8	5	-23
Working class	18	16	-2	6	-12
None	35	29	-6	7	-28
Education					
High	12	8	-4	4	-9
Intermediate	21	14	-7	4	-17
Low	27	23	-4	6	
Living situation					
Couple	22	16	-6	3	-19
Single	19	16	-4	8	-11
Total	**21**	**16**	**-5**	**5**	**-16**

Note: The at-risk-of-poverty threshold is calculated as 60% of the EU-SILC adjusted median equivalent net monthly income from personal income sources. See chapter 7 for more details. Δ is the difference (%) between the poverty rate before and after the inclusion of assets in the income package.

Source: Author's calculations based on SHARE wave 2

In addition, Table 8.23 allows us to investigate the effect of the inclusion of assets on the at-risk-of-poverty rate of the different vulnerable groups. When we compare the poverty rate before and after assets, based on the direct available income, we find that the inclusion of assets does not remove the differences between men and women, and between younger and older elderly. For living situation, including the direct available income from assets in the extended income package removes the higher poverty risk of elderly living with a partner.

When we compare the poverty risk before and after assets based on the simulated income from assets, again we do not find that this removes the differences between men and women. The at-risk-of-poverty rate still is a little higher for women than for men (resp. 6% and 3%). For age, however, including the simulated income from assets manages to remove the difference between older and younger groups of elderly. Lastly, including the simulated income from assets inverts the difference between single living elderly and elderly living with a partner. Whereas before assets, the at-risk-of-poverty rate is higher for elderly living with a partner than for single living elderly (resp. 22% vs. 19%), this is no longer the case after the inclusion of the simulated income from assets. In that case, only 3% of the elderly living with a partner has an income below the EU-SILC adjusted poverty threshold, compared to 8% of the single living elderly.

The at-risk-of-poverty rate based on the age-specific poverty threshold

To compensate for the fact that in the previous section no completely relative picture of the poverty risk is sketched, we also use the age-specific poverty thresholds to assess the quality of the old age income package. Table 8.24 shows the age-specific at-risk-of-poverty rate before and after assets. After assets, we distinguish the available and the simulated income from the extended income package. The difference between the poverty rates before and after assets is shown in the Δ columns.

Before assets are included in the income package, about 11% of the research population has an income below the poverty threshold (i.e. based on the personal old age income package only). This does not really change when the available income from assets is included in the extended income package: again about 11% of the research population has an income below the poverty threshold (i.e. based on the available income from the extended income package). However, when the simulated income from assets is considered as part of the extended old age income package, the at-risk-of-poverty rate increases to 17%. To put it differently, when account is given to the potential income from home ownership, financial assets and secondary residence ownership, the at-risk-of-poverty rate increases with about 6%. This indicates an unequal distribution of asset sources among the elderly population.

Table 8.24. Age-specific at-risk-of-poverty rate before and after assets by sex, age, occupational status, level of education and living situation (weighted, 2007)

	Poverty rate	Poverty rate after assets (%)			
	before assets (%)	Direct	Δ	Simulated	Δ
Sex					
Male	11	10	-1	15	4
Female	12	13	1	19	7
Age					
60-74	12	11	-1	17	5
75+	10	12	2	18	7
Occupational status					
Salariat	9	7	-2	9	0
Intermediate	15	15	-1	17	1
Working class	7	10	3	25	17
None	19	21	2	20	1
Education					
High	10	8	-2	7	-3
Intermediate	11	10	-2	17	5
Low	12	16	4	24	12
Living situation					
Couple	11	11	0	13	2
Single	12	13	1	24	12
Total	**11**	**11**	**0**	**17**	**6**

Note: The age-specific at-risk-of-poverty threshold before assets is calculated at 60% of the median net equivalent income from personal income sources of the research population. The age-specific at-risk-of-poverty threshold after assets (available) is calculated at 60% of the available median net equivalent income from the extended income package of the research population. The age-specific at-risk-of-poverty threshold after assets (simulated) is calculated at 60% of the simulated median net equivalent income from the extended income package of the research population.

Source: Author's calculations based on SHARE wave 2

Table 8.24 also shows the at-risk-of-poverty rate by a number of sociodemographic and socioeconomic background variables. This allows us to investigate the existence of vulnerable groups. When we compare the poverty rate before and after assets, based on the available income, we find that the poverty rate of the vulnerable groups (i.e. women, singles, the oldest elderly) increases slightly. For example, including the available income from assets increase the poverty rate of older women from 12% to 13%, while it reduces the poverty rate of older men from 11% to 10%. Similarly, the poverty rate of elderly aged 75 years and over increases from 10% to 12%, while the poverty rate of the elderly between 60 and 74 years decreases from 12% to 11%. Including the available income from assets in the extended income package thus overall does not really influence the overall poverty risk of the elderly population, but it does (slightly) increase the differences between certain groups and stresses the more vulnerable situation of older women, the oldest elderly and singles.

The conclusions are somewhat different when we compare the poverty risk before and after assets based on the simulated income from assets. Including the simulated income from assets in the extended income package emphases the more vulnerable income position of older women, singles and elderly with a low socioeconomic status (i.e. low occupational status and/or low level of education). After including the simulated income from assets, about one fifth of the female research population has an income below the poverty threshold compared to about 15% of their male counterparts. A quarter of the singles in the research population is considered as at-risk-of-poverty, versus 13% of the research population living together with a partner. This is at odds with our earlier findings on the generosity of the extended old age income package in which the differences between men and women, and between singles and elderly living with a partner were rather small. This is explained by the fact that asset sources are distributed unevenly among the elderly population, favouring those with a higher asset accumulating potential like men and elderly living with a partner.

When we investigate the transition in and out of poverty with the inclusion of assets to the extended old age income package, we find the following. When based on the available income of assets, about 23% of those considered as poor before the inclusion of assets, are no longer considered as poor after the inclusion of assets. Similarly, about 23% of those at-risk-of-poverty after the inclusion of assets were not considered as poor before the inclusion of assets in the extended old age income package.[109] Adding the simulated income from assets, however, manages to lift about 52% of the elderly at-risk-of-poverty before assets above the age-specific poverty threshold. Yet, about 70% of the elderly below the poverty threshold after the inclusion of assets, were not considered as poor before the inclusion of assets. This again illustrates that including the simulated income

[109] Or, to put it differently, 3% of the elderly above the age-specific poverty threshold before assets are considered as poor when the available income from assets is included.

from assets in the extended old age income package increases the differences among the elderly population.

4.3.2 Enhancing old age income equality

Based on the statistics presented in the previous section, it is expected that old age income inequality increases when the contribution from assets is added to the personal old age income package, specifically when the simulated asset contribution is considered. After all, asset ownership was found to be unequally spread among the elderly population, and the same was found to be true for the available and the simulated contribution from these sources to the income of the elderly population. To investigate this, we study two indicators: the income ratio and the Gini coefficient.

The income ratio (income quintile share: S80/S20) gives the ratio of the highest income group to the lowest income group. The higher the ratio, the larger the difference between both, and the larger the degree of income inequality. In section 2.1 of this chapter, the income quintile share based on the personal income package was calculated. The income from personal income sources of the upper quintile was five times larger than that of the bottom income quintile (income quintile share of 5.0787). When the direct available income from assets is added to the income package, the ratio between S80 and S20 is 5.0802 (see Table 8.25). The difference between the income ratio before and after assets, based on the available asset contribution, is thus negligible. However, this is different when the income quintile share is calculated for the extended old age income package including the simulated contribution from assets (i.e. including the reverse mortgage on home ownership and the fictitious annuities of financial assets and secondary residence). In that case, the income quintile share is 6.5867. The total simulated income from the extended old age income package of the upper income quintile is more than six times larger than that of the bottom income quintile. Further, before and after assets, based on the simulated asset contribution, the income quintile share increases with about a third. Adding the simulated income from assets thus increases the income inequality among the Belgian older population.

Table 8.25. Income quintile share and Gini coefficient before and after adding assets to the old age income package (weighted, 2007)

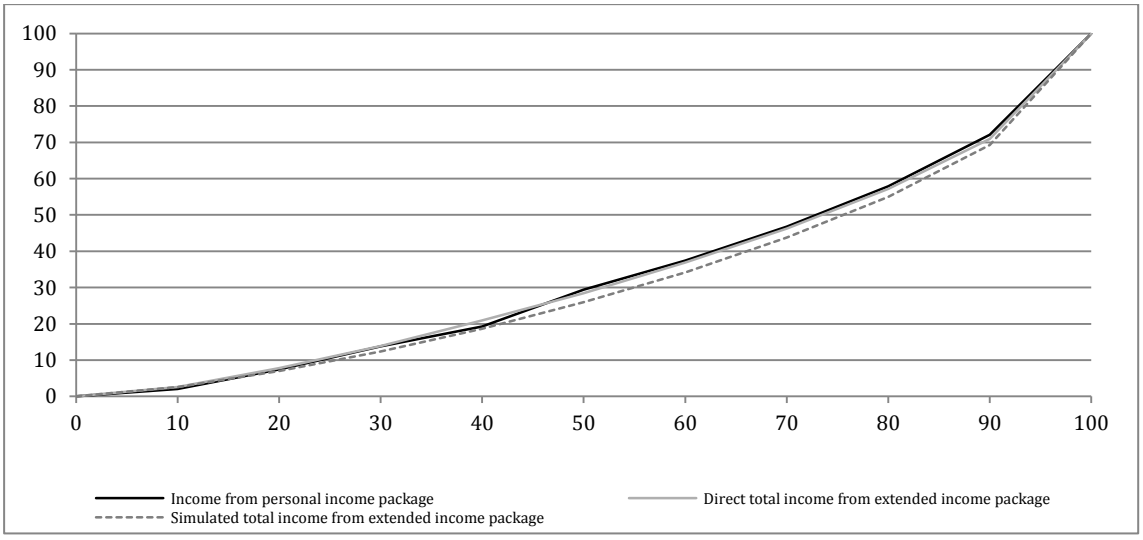
	Income quintile share S80/S20	Gini coefficient
Before assets	5.0787	0.3391
After assets		
Direct total income	5.0802	0.3402
Simulated total income	6.5867	0.3696

Source: Author's calculations based on SHARE wave 2

In addition, Table 8.25 also shows the Gini-coefficient, another indicator of the (in)equality of the income distribution. The closer the Gini-coefficient is to one, the larger the degree of inequality in the income distribution. For the extended old age income package, based on the direct total income, the Gini-coefficient is 0.3402. This is slightly larger than the Gini-coefficient based on the personal old age income package (before assets). Including the direct contribution from assets in the extended income package thus increases slightly the inequality of the income distribution. This conclusion becomes more robust when the Gini coefficient based on the extended income package with the simulated contribution from assets is considered. The Gini coefficient is 0.3696, and about 9% larger than the Gini coefficient based on the personal income package. Taking account of assets thus does not improve the income distribution among the Belgian elderly population.

The Lorenz curve is the graphical display of the Gini-coefficient; it shows the cumulative income distribution and indicates the equality of the income distribution. Figure 8.11 shows the Lorenz curve for the personal income package (black line) and for the extended income package. We distinguish the distribution of the direct available income (pale grey line) and the simulated income of the extended income package (dotted line). The curves are very close to each other, which indicates little differences in the income distribution. In the second half of the income distribution, the difference between the personal income curve and total direct income curve on the one hand, and the total simulated income on the other hand becomes larger. Adding a reverse mortgage from home ownership and spending assets via fictitious annuities increases income inequality when compared to the situation based on the income from personal income sources or when based on the available income from the extended income package.

Figure 8.11. Lorenz curve of the equivalent monthly income from resp. the personal income package and the extended income package (direct and simulated total income) (weighted, 2007)



Source: Author's calculations based on SHARE wave 2

5. Conclusion

In this chapter, we focused on the old age income package and the protection this income package provides against the financial dimension of age related dependency. We addressed the following research questions: What does the old age income package look like? How are the composition and the generosity of the old age income package related? What level of protection does the old age income package provide against the financial dimension of old age dependency (i.e. income dependency)? What groups are more vulnerable and enjoy lower levels of protection when the old age income package is considered. The answer provided was threefold.

Concerning the personal old age income package

First, the personal old age income package was investigated. Only income sources with personal ownership, like pensions and wages, were included. Account was given to the returns of scale from living together with a partner. Based on a hierarchical cluster analysis presented in chapter 7, seven income clusters were discerned, varying in the type and the number of income sources included. The income clusters, or packages, ranged from less to more diverse on the number and type of income sources included.

The majority of the research population has a first pillar pension, either or not in combination with other income sources. About one third only has a first pillar pension, about 9% combines a first pillar pension and a second pillar pension, and 28% combines a first and third pillar pension. Almost one in five elderly does not have personal income sources. The net average equivalent income from these personal income sources is 1300 Euros on a monthly basis. However, with a median income of 1067 Euros per month large differences in the income distribution exist. About 21% of the research population has an income below the EU-SILC adjusted poverty threshold of 793 Euros per month. The income quintile share indicated that the personal income from the upper income quintile is about five times larger than that of the bottom income quintile.

An ideal type description of the research population showed that elderly with only a first pillar pension at their disposal most often are older women (75 years and over) with a relatively low socioeconomic status, while elderly that combine a first pillar pension with a second and/or a third pillar pension overall are younger (60-74 years) men with a relatively high socioeconomic status. Further, elderly that only have a third pillar pension or have no personal income sources at their disposal overall are women between 60 and 74 years living together with a partner, and with a low to intermediate socioeconomic status.

A multinomial logit model investigating the determinants of the composition of the personal income package, indicated that the composition is significantly influenced by one's former occupational status, level of education, living situation, sex and age. Women and the oldest elderly have lower odds on having a more diverse personal income

package. They less often have a second or third pillar pension, which indicates their more vulnerable income position. The generosity of the personal income package, on his turn, showed to be influenced by the income package composition: having a more diverse income package was related to having a higher income from the personal income package. Also classic inequalities were confirmed in that high-status elderly (i.e. with a high occupational status and/or a high level of education) showed to have a higher income from the old age income package than low-status elderly.

Concerning the asset package

Secondly, attention was paid to the asset package. This includes assets that are shared within the household: financial assets (e.g. savings in bank accounts, stocks and bonds), and property assets (home ownership and secondary residence ownership). The contribution from assets to the old age income package is approached in different ways:

- via the direct asset income: interests from financial assets and rental incomes from secondary residence;
- via the potential simulated asset income: fictitious annuities from financial assets and secondary residence, and a reverse mortgage on home ownership; and
- via an assessment of the asset stock and its potential to provide income protection during a period of income deprivation (asset poverty).

Asset ownership was found to be common good among the elderly population: 97% owns some kind of financial asset, and almost 80% of the research population combines financial and property assets. The contribution from assets is larger when more asset sources are included in the asset package. Overall, the mean direct monthly contribution from assets is 165 Euros per month, the mean simulated contribution, which includes a reverse mortgage on home ownership, is 1442 Euros per month. About 23% of the research population does not have an asset stock sufficient to cope with three months of absolute income deprivation.

Important links between the personal old income package and the asset package were found. The inequalities in the personal old age income package were reproduced in the asset package. A higher degree of diversification in the personal old age income package goes hand in hand with a higher degree of asset ownership, particularly for property ownership. Also, a more generous personal old age income package is associated with higher rates of property ownership: property ownership increases along the personal income distribution. Similarly, the direct contribution from assets is larger for elderly with a more generous personal income package than for elderly with a less generous personal income package. The relationship between the simulated contribution from assets and the income from the personal income package was less straightforward, and not statistically significant. Further, asset poverty was lower among elderly with a more generous personal income package than among elderly with a less generous personal income package. For example, almost a quarter of the research population with a personal income

in the first income decile is considered as at-risk-of-asset-poverty compared to only 12% of the elderly with a personal income in the tenth income decile. Overall, we can speak of a kind of double Matthew effect: elderly with a larger income from personal income sources do not only have more access to assets, also the direct and potential revenues from these assets, as well as the protection these assets provide against periods of income deprivation, are larger.

In the asset package, the more vulnerable position of older women, the oldest elderly, singles and low-status elderly is confirmed. Property ownership is significantly smaller among the oldest elderly, elderly with a lower occupational status, and singles. No significant differences are however found when the direct contribution from assets is considered. Neither the direct available income from assets, nor the simulated income from assets is lower for women than for men. Also individuals older than 75 years, and between 60 and 74 years are not significantly different when the direct asset contribution is considered. When the simulated asset contribution is investigated, the oldest elderly even show to be significantly better off, although this is mainly the result of the inclusion of remaining life expectancy in the simulation of the potential asset contribution.

Concerning the extended income package

Third, personal income sources and asset sources were combined into the extended old age income package. Again, we distinguished the direct extended income package (including the direct income from assets via interests and rental incomes) and the simulated extended income package (including the simulated potential income from assets).

On average, including the direct income from assets in the extended income package increases the income with about 160 Euros, to about 1458 Euros per month (net equivalent monthly income). Adding the simulated asset income to the income from personal income sources results in an average monthly income of 2734 Euros per month. When moving up the income distribution, the direct contribution from financial assets becomes relatively more important. Similarly, when we consider the income distribution based on the simulated income from the extended old age income package, the relative contribution of property ownership increases steadily when moving up the income distribution.

Further, adding the direct available asset income to the extended income package does not succeed in removing the more vulnerable income position of women, the oldest elderly, singles and low-status elderly. However, this changes when the simulated income from assets is added. The more vulnerable income position of singles and the oldest elderly disappears in that case. However, this is not really the result of the success of the income package, but stems from the inclusion of the remaining life expectancy and living situation in the simulation of the potential asset income. Older individuals have a shorter time span

during which the asset stock is spent, and singles do not have to share their asset stock with a partner. This leads to a higher simulated income from assets.

To assess the quality of the extended income package, different indicators were used. Firstly, we used both the EU-SILC adjusted poverty threshold and the age-specific poverty threshold to compute the poverty risk. Adding assets to the old age income package does not remove the more vulnerable income situation of certain older groups. The poverty risk of women, elderly above 75 years, low-status elderly (i.e. elderly with a low level of education and/or a low occupational status) and singles remains higher, irrespective of the poverty threshold that was used. Another interesting fact was that in the completely relative approach (i.e. based on the age-specific poverty thresholds), the inclusion of assets increases the poverty risk of certain groups of elderly. For example, the age-specific poverty rate increases among elderly with a low occupational status, resp. low level of education when the direct asset income is added to the extended old age income package. Moreover, adding the simulated income from assets increases the poverty rate even more. Before assets about 11% of the research population has an income below the poverty threshold, whereas after including the simulated income from assets this increases to 17%. Women, the oldest elderly, low-status elderly and singles were the main victims of this increase in the poverty rate. Adding the simulated income from assets to the old age income package thus does not contribute to providing more protection against poverty for the more vulnerable groups. Secondly, we investigated whether adding assets contributes to a more equal distribution of resources among the elderly population. Including the direct income from assets did not give any result: little to no difference was found between the income quintile share and the Gini coefficient based on the income from personal income sources and the direct income from the extended income package. However, when we add the simulated income from assets, the inequalities in the income distribution increase. The income quintile share increases from 5.1 to 6.6; and the Gini coefficient increases from 0.34 to 0.37. Adding the simulated income from assets thus favours a small group of high-income elderly, with a large asset stock.

Overall conclusion

Our findings have important consequences for policy makers, who increasingly stress the potential contribution from asset sources to maintain a decent level of income protection during old age. Our analyses proof that adding assets to the old age income package to tackle the debates on old age poverty and income inequality is not just the goose that lays the golden eggs. It increases age-specific poverty rates, and adds to the already vulnerable situation of specific groups of elderly, like women and singles. Further, it increases income inequality, which is at odds with the main goals of the welfare state.

Also, one should bear in mind that a part of the analyses are based on a reverse mortgaging hypothesis to include the wealth from home ownership in the old age income package. Yet, until now, no such thing is really possible in Belgium because of the lack of a

legal framework for reverse mortgaging as an insurance product. Policy makers willing to introduce such a mechanism should pay sufficient attention to its potential contribution to the old age income package. Also, it should be investigated how this changes the income situation of the elderly population in comparison with the rest of the population. Further, the introduction of reverse mortgaging, or related schemes, should include decent protection mechanisms for the older population: residence must be guaranteed until the elderly person deceases or decides to move out (for example to a residential care facility). Income from reverse mortgaging must be guaranteed, even when the potential property wealth is consumed entirely; and comprehensible information should be provided on the reduced possibility for bequests in case of reverse mortgaging.

In addition, to completely assess the impact of adding an asset based annuity to the income from personal income sources on the financial dependency and the poverty risk of the elderly population, a strategy should be developed to compare the younger cohorts of elderly that have just left the labour market with the rest of the population. After all, only for this group the correct estimation of the potential asset based annuity can be made, taking account of their remaining life expectancy and their asset stock at the moment of retirement. In doing so, it will become possible to compare this group with the rest of the population to investigate whether or not including an asset based annuity in the extended old age income package actually contributes to additional and sufficient protection against the financial dimension of old age dependency. However, this requires an extensive amount of income and asset information of the entire population, which is not available in the SHARE, since this survey is limited to the population aged 50 and over.

In the next chapter, we investigate the wide range of mechanisms that are available to the Belgian older population to provide protection against the functional dimension of old age dependency. We focus on the use of health and social care services of the elderly population confronted with an increased level of physical dependency in old age. Our main point of interest is the relationship between the care package and the (extended) income package: are the inequalities in the income package reproduced in the care package, what vulnerable groups can be discerned, etc.

CHAPTER 9

OPERATIONALISATION OF THE OLD AGE CARE PACKAGE

CHAPTER 9. OPERATIONALISATION OF THE OLD AGE CARE PACKAGE

In the previous chapter the first research question, investigating the protection provided by the old age income package against the financial dimension of old age dependency, was tackled. This chapter takes a first step towards answering the second research question on the protection the Belgian elderly population enjoys against the functional dimension of old age dependency. This requires a move from the theoretical concept of care packaging to an operational, measurable concept. The operational concept includes different types of health and social care services, provided by both formal and informal caregivers. Because we use SHARE data, we are limited to the services that are questioned in the SHARE. We distinguish the use of the services on the one hand, and the intensity of utilisation on the other hand. Furthermore, we construct some indicators to assess the quality of the care package of the elderly population.

In the first section we operationalise the composition of the old age care package. Account is given to the use of health care services on the one hand, and social care services on the other hand. Inspired by van Vliet, Broese van Groenou, and Deeg (2010) we investigate whether the use of care services is clustered into care packages. In the second section, we focus on the operationalisation of the intensity of the use of the different care services. In the last section, indicators to assess the quality of the care provided are developed and discussed.

1. Composition of the old age care package

The composition of the old age care package includes the use of health care services (e.g. doctor visits, specialist visits, hospital treatments) (section 1.1), and social care services (e.g. assistance with ADL and IADL) (1.2). These services are provided by formal and/or informal caregivers, from inside and/or outside the care receiver's household. In section 1.3 we investigate the possibility to distinguish care packages.

1.1 The use of health care services

The use of health care services focuses on whether the respondent has had contact with first-line or second-line health care providers in the last year. Information on this is included in the module on health care in the SHARE. The following questions contain information on the use of health care services:

hc002 Now we have some questions about your health care. Please think about your care during the last twelve months. During the last twelve months, about how many times in total have you seen or talked to a medical doctor about your health? Please exclude dentist visits and hospital stays, but include emergency room or outpatient clinic visits.
[Numerical value]

hc003 How many of these contacts were with a general practitioner or with a doctor at your health care centre?
[Numerical value]

hc004 Please look at card 15. During the last twelve months, have you consulted any of the specialists mentioned on card 15? *(multiple answers possible)*

1. Specialist for heart disease, pulmonary, gastroenterology, diabetes or endocrine diseases
2. Dermatologist
3. Neurologist
4. Ophthalmologist
5. Ear, nose and throat specialist
6. Rheumatologist or physiatrist
7. Orthopaedist
8. Surgeon
9. Psychiatrist
10. Gynaecologist
11. Urologist
12. Oncologist
13. Geriatrician

1. Yes
5. No

Elderly with at least one visit to a general practitioner are assigned (hc003) with first-line health care services ownership. Elderly answering affirmative on the question concerning specialist visits (hc004) are assigned with second-line health care services ownership.

One should note that the respondents are asked to recall the health care contacts they have had during the last twelve months. Because of the extensive time span, it is unlikely that respondents will recall all health care contacts they had during the investigated time span. Such memory effects lead to bias in the respondent's answers, and has consequences for the research results in that the number of health care contacts probably is underestimated (e.g. Gray, 1955; Sudman & Bradburn, 1973). In addition, it is likely that the more important health care contacts (for example, contact with a specialist for an important cardiac problem) are recalled, and that respondents will forget to report the less important health care contacts (for example, contact with a general practitioner when the respondent was hit by the flue). However, one advantage of investigating health care contacts over a longer time span is that is rules out seasonal differences in health care contacts. For example, during winter time individuals are more likely to become ill and have contact with a health care provider than during spring or summer time. By spreading the enquiry over a 12 month period, these seasonal differences are included in the registration.

Another disadvantage of the question on contact with a specialist (hc004) is in the phrasing of the question. The question is formulated as a check-all-that-apply question: respondents are asked to indicate all contacts they have had with a specialist from a quite long list of different specialists. Research (Billiet & Matsuo, 2012) has shown that respondents will try to estimate the number of "required" answers, and they will answer according to this. Consequently, check-all-that-apply questions will lead to an under reporting of the different types of specialists one had contact with. Moreover, it is likely that respondents will limit their answers to the social desirable answers in making their pragmatic selection, which again will lead to bias in the registered answers, and eventually in the research results based on these answers (Billiet, 2011).

The receipt of hospital treatments, either as an inpatient or as an outpatient (i.e. hospital treatment without overnight stay), is based on two questions in the module on health care:

hc012 During the last twelve months, have you been in a hospital overnight? Please consider stays in medical, surgical, psychiatric or in any other specialised wards.
1. Yes
5. No

hc023 During the last twelve months, have you had outpatient surgery?
1. Yes
5. No

Respondents answering affirmative on one of both questions (hc012 and/or hc023) are considered as having received hospital treatment. We have decided not to make a difference between inpatient and outpatient hospital care, because we are interested in the receipt of hospital care as such, irrespective of whether the respondent received this care as an inpatient or as an outpatient. One can argue that important differences exist in the type and the intensity of the hospital care received as an inpatient and as an outpatient. Yet, we chose not to include a high degree of detail in the type of hospital care received, and differences in the intensity of the care received are accounted when the overall intensity of health and social care services received is considered (cf. infra).

Based on the information in the preceding questions, we have constructed a number of health care ownership variables. We distinguish between the receipt of first-line health care (general practitioner), second-line health care (specialist), and the receipt of hospital care (either out- or inpatient). Table 9.1 gives for each health care service the unweighted proportion of the research population that received this type of care in the last year. The majority has had contact with a general practitioner (95%), whereas 57% of the research population had contact with at least one specialist. About a quarter of the research population received any kind of hospital treatment.

Table 9.1. Use of health care services by the research population (unweighted, 2007)

		Use			
Health care service	**Based on …**	**Yes (%)**	**No (%)**	**Total (N)**	**N missing**
First-line health care	hc002 / hc003	95	5	1692	6
Second-line health care	hc002 / hc004	57	43	1692	6
Hospital treatment	hc012 / hc023	25	75	1692	3

Source: Author's calculations based on SHARE data wave 2

1.2 The use of social care services

The receipt of social care services is included in two modules of the SHARE. Formal social care services are questioned in the module on health care. Respondents can indicate if they have received formal nursing care, personal care and/or home help (hc032). Also the receipt of formal care in a residential setting is questioned (hc029):

hc032 Please look at card 17. During the last twelve months, did you receive in your own home any of the kinds of care mentioned on this card? *(Multiple answers possible)*
1. Professional or paid nursing or personal care
2. Professional or paid home help, for domestic tasks that you could not perform yourself due to health problems
3. Meals-on-wheels
96. None of these

hc029 During the last twelve months, have you been in a nursing home overnight?
1. Yes, temporarily
3. Yes, permanently
5. No

The receipt of informal care is questioned in the SHARE module on social support. First, it is questioned whether the respondent and/or his/her partner has received informal care (sp002). Second, it is questioned which type of care the respondent and/or his/her partner received (personal care, household help or administrative help) (sp004):

sp002 Please look at card 38. Thinking about the last twelve months, has any family member from outside the household, any friend or neighbour given you or your partner any kind of help listed on this card?

1. Personal care, e.g. dressing, bathing or showering, eating, getting in or out of bed, using the toilet
2. Practical household help, e.g. with home repairs, gardening, transportation, shopping, household chores
3. Help with paperwork, such as filling out forms, settling financial or legal matters

1. Yes
5. No

sp004 Please look at card 38. Which types of help has this person provided in the last twelve months? *(Multiple answers possible)*

1. Personal care, e.g. dressing, bathing or showering, eating, getting in or out of bed, using the toilet
2. Practical household help, e.g. with home repairs, gardening, transportation, shopping, household chores
3. Help with paperwork, such as filling out forms, settling financial or legal matters

An important disadvantage of the questions on the receipt of informal care is that these questions are registered as the household level. The questions thus point to the receipt of informal care by the respondent and/or his/her partner. The answers provided by the household respondent were transferred to all the other household members in the survey. Consequently, it is not possible to determine whether the care was received by the household respondent and/or by his/her partner. This is particularly important when the receipt of personal care is concerned, because personal care always is limited to the person receiving this type of care. In transferring the receipt of informal personal care to all household members it is possible that the receipt of personal care is ascribed to a household member who actually has not received personal care. This is expected to lead to an overestimation of the receipt of informal personal care. We expect this to be less important when the help with household chores is considered, because home help is more likely to be shared within the household and to contribute to the wellbeing of all household members.

Respondents can report on social care received from maximum three different informal caregivers. Question sp007 in the module on social support makes it possible to determine whether the respondent has received informal care from more than one caregiver. When the respondent answers affirmative on this question, the type of care received is determined via question sp004 above.

sp007 Is there any other family member from outside the household, friend or neighbour who has helped you or your partner with the tasks listed on card 38 in the last twelve months?
1. Yes
5. No

Further, also the receipt of informal care within the household is questioned in the module on social support. In contrast with the questions on informal care from outside the household, the receipt of within-household informal care is questioned at the individual level:

sp018 And is there someone living in this household who has helped you regularly during the last twelve months with personal care, such as washing, getting out of bed, or dressing?
1. Yes
5. No

Note that within-household informal care is limited to personal care like washing, dressing, etc. (ADL), whereas outside-household informal care also includes help with more operational household chores (IADL). Most obviously, within-household help with

household chores is not questioned because this is considered as part of the regular within-household distribution of household chores.

Table 9.2 gives the unweighted proportion of the research population that receives social care. About 13% of the research population has received formal home help, and 11% has received formal personal care. The use of residential long-term care is negligible. Concerning informal care, we find that 27% of the research population has received informal home help from outside the household. Only a minority has received informal personal care: 2% of the research population has received informal personal care from outside the household, and 5% received within-household informal personal care.

Table 9.2. Use of social care services by the research population (unweighted, 2007)

		Use (%)			
Social care service	**Based on …**	**Yes**	**No**	**Total (N)**	**N missing**
Formal care					
Home help	hc032 (items 2, 3)	13	87	1664	28
Personal care	hc032 (item 1)	11	89	1664	28
Residential care	hc029	0	100	1665	27
Informal care					
Inside household	sp018	5	95	1692	0
Outside household					
Home help	sp002 (item 2, 3)	27	72	1691	1
Personal care	sp002 (item 1)	2	98	1691	1

Source: Author's calculations based on SHARE data wave 2

1.3 Defining care clusters via a hierarchical cluster analysis

Based on the use of health care services on the one hand, and social care services on the other hand, we investigated the possibility to identify clusters of care services. This is inspired by an analysis of Van Vliet, Broese Van Groenou, and Deeg (2010) on the existence of extramural care packages among the Dutch population aged 70 and over with data from the Longitudinal Aging Study Amsterdam (LASA). Based on different configurations of appliances, health care services, and social care services, they distinguished eight extramural care packages:

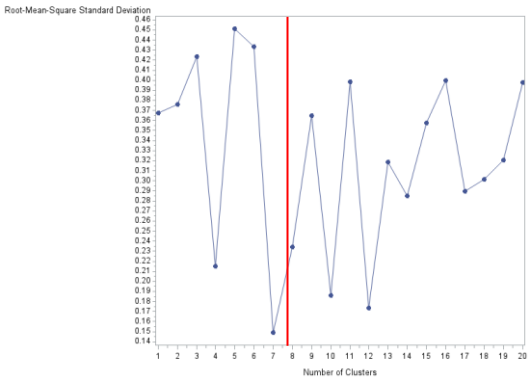
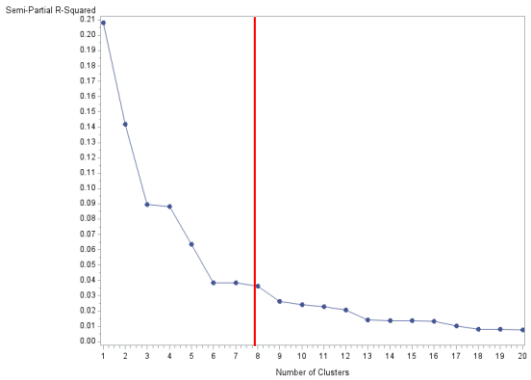
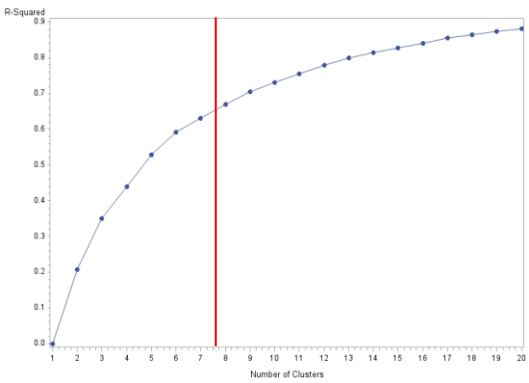
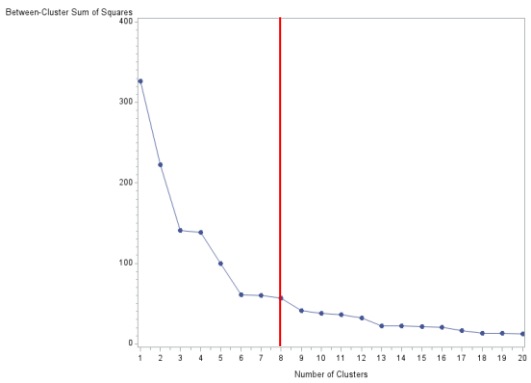
1. Minor care utilisation: elderly that rely not or only to a very limited extent on health and social care services;
2. Primary (first-line) health care: the majority of this group of elderly has had contact with a general practitioner or a dentist, no other care services are dominant;
3. Second-line health care: contact with a specialist is dominant within this care package, most often combined with contact(s) with primary health care providers;
4. Particular home help: the majority of this group receives assistance with household chores provided by a particular care giver, though not with personal care tasks;

5. Informal care and hospital care: the receipt of hospital care is dominant among the elderly with this care package, as well as the receipt of informal help for either personal care and/or home help;
6. Formal home help: almost all elderly with this care package rely on professionally provided home help;
7. Mixed care package: different types of care (health care services, formal and informal care services for personal care and/or home help) are used by the elderly with this type of care package;
8. Care network with transmural care: in this care package elderly with the most severe degree of care dependency, combining intensive extramural care services with transmural care services like day care centres and short stays in elderly homes, are found.

According to Van Vliet et al. (2010), the composition of the care packages is hierarchical: they build on each other, in that the previous care package is (largely) incorporated in the following care package (see **Fout! Verwijzingsbron niet gevonden.**). For example, elderly receiving home help from a particular care giver (i.e. fourth care package) most often also receive primary and secondary health care (i.e. reflecting the second and the third care package).

To distinguish the presence of care packages in the SHARE data, and inspired by the approach of Van Vliet et al. (2010), we executed a hierarchical cluster analysis. The following variables on the receipt of health and social care services were used as the input variables: contact with first-line health care (general practitioner), contact with second-line health care (specialist), the receipt of hospital treatment, the receipt of formal home help, the receipt of formal personal care, the receipt of informal home help and the receipt of informal personal care. Similar to the strategy in chapter 7, we used the Ward's technique to distinguish the care clusters. Four test statistics (i.e. the root-mean-square standard deviation (RMS STD), the semi partial R-squared (SPR), the R-squared (RS) and the inter-cluster distance (CD)) were calculated and plotted in SAS to decide on the most appropriate number of clusters (see Table 9.3). To recall, according to Sharma (1996) the RMS STD, that measures the homogeneity of the new cluster, as well as the RMS and the CD, indicating the homogeneity of the merged clusters, should be low. The RS, which measures the heterogeneity of the clusters, should be high (see chapter 7).

Table 9.3. Overview of the hierarchical cluster analysis statistics to decide on the number of care clusters

Root-mean-square standard deviation (RMS STD)	Semi-partial R-squared (SPR)
	
R-squared (RS)	**Inter-cluster distance (CD)**
	

Based on the test statistics of the cluster analysis, it was decided that a seven cluster solution fits our data best. The RMS STD is quite low in comparison with other cluster solutions. Also the SPR and CD are relatively low when compared to the other cluster solutions. The R-squared (RS) is relatively high in the seven cluster solution and decreases with a more limited number of clusters. Each cluster can be associated with a certain type of health and social care service use. To determine the character of each cluster, the relative distribution of the research population by cluster and their use of health and social care services was studied (Table 9.4).

Table 9.4. Relative distribution of the research population by care cluster and health and social care services use (unweighted, 2007)

	Total		% health and social care services use						
			Health care			Formal care		Informal care	
Cluster	N	%	1st line	2nd line	Hospital care	Home help	Personal care	Home help	Personal care
1	478	29	86	0	0	1	0	3	0
2	376	23	100	100	0	0	0	0	0
3	200	12	99	77	100	0	0	6	0
4	234	14	100	66	20	0	0	100	0
5	151	9	100	61	32	100	16	50	9
6	69	4	97	77	52	1	23	38	100
7	151	9	100	78	51	36	97	54	24
Total	1659	100							

Note: 33 respondents were excluded from the cluster analysis because they had missings on at least one of the health and social care variables included in the analysis. Informal home help only includes home help provided by informal caregivers from outside the household. Informal personal care includes personal care from informal caregivers inside and outside the household.

Source: Author's calculations based on SHARE data wave 2

In the first cluster, the overall use of health and social care services is low, and the majority only had contact with a general practitioner (86%). This matches the "minor care utilisation" plus the "primary (first-line) health care" cluster differentiated by Van Vliet et al. (2010); 29% of the research population belongs to this care cluster. The second cluster includes 23% of the research population; these respondents combine first- and second-line health care services. All respondents belonging to the third cluster (12% of the research population) have received a hospital treatment. This partially corresponds to the fifth cluster differentiated by Van Vliet et al. (2010). The fourth cluster includes about 14% of the research population. This cluster is characterised by the receipt of informal assistance with IADL (home help), while in the fifth cluster (9% of the research population) also formal home help is used. In the sixth care cluster, the focus is on the receipt of informal personal care services. To a more limited extend, the respondents in this cluster also receive informal home help (38%). This cluster is the smallest with only 4% of the research population. The last cluster resembles the most intensive use of health and social care services. Respondents belonging to this cluster receive formal and informal care with ADL and IADL, and score relatively high on the receipt of health care services. For example, the majority has had contact with first- and second-line health care providers. About 9% of the research population belongs to this intensive care cluster. To summarise, the cluster analysis resulted in the following seven care clusters or care packages:

1. Minor care use: elderly have a low use of health and social care services, and mainly rely on first-line health care services;
2. Second-line health care: a combination of first-line and second-line health care services;
3. Hospital care: the focus is on the receipt of hospital treatment, either as an in- or as an outpatient;

4. Informal home help: this group of older persons receives assistance with IADL in the form of informal home help services;
5. Formal home help: the receipt of formal home help is dominant, yet an important part of this group combines this with informal home help;
6. Informal personal care: informal assistance with ADL is central, though to a limited extent it is combined with formal personal care and informal home help;
7. Mixed care package: different types of health and social care services are combined.

2. Intensity of care use

The intensity of the use of health and social care services refers to the number of times the elderly population received health and care during the last year. We distinguish the intensity of the use of health care services on the one hand (2.1), and the intensity of the use of social care services on the other hand (2.2).

2.1 Intensity of health care services use

To operationalise the intensity of the use of health care services, we constructed a categorical variable based on the number of times the older person had contact with a health care practitioner or a health care service during the last year.

Information on the intensity of the use of health care services is included in the SHARE module on health care. Question hc003 includes the contacts with first-line health care providers (general practitioners). Contacts with second-line health care providers (specialists) are based on the questions hc002, hc003 and hc004. When a respondent answered affirmative on having had contact with a specialist (hc004), the intensity of the contact is the difference between the number of contacts questioned in hc003 (contact with GP) and hc002 (overall number of contacts with health care providers).

hc002 Now we have some questions about your health care. Please think about your care during the last twelve months. During the last twelve months, about how many times in total have you seen or talked to a medical doctor about your health? Please exclude dentist visits and hospital stays, but include emergency room or outpatient clinic visits.
[Numerical value]

hc003 How many of these contacts were with a general practitioner or with a doctor at your health care center?
[Numerical value]

hc004 Please look at card 15. During the last twelve months, have you consulted any of the specialists mentioned on card 15? *(multiple answers possible)*

1. Specialist for heart disease, pulmonary, gastroenterology, diabetes or endocrine diseases
2. Dermatologist
3. Neurologist
4. Ophthalmologist
5. Ear, nose and throat specialist
6. Rheumatologist or physiatrist
7. Orthopaedist
8. Surgeon
9. Psychiatrist
10. Gynaecologist
11. Urologist
12. Oncologist
13. Geriatrician

1. Yes
5. No

The intensity of the receipt of hospital care is questioned in hc013 (inpatient) and hc024 (outpatient). Lastly, we also include the receipt of health care services in other institutions, like rehabilitation homes (hc065). Note that no account is given to the length of the stay in hospitals or other residential care facilities.

hc013 How often have you been a patient in a hospital overnight during the last twelve months?
[Numerical value]

hc024 How often have you had outpatient surgery during the last twelve months?
[Numerical value]

hc065 How often have you been a patient overnight in any institution other than a hospital or a nursing home during the last twelve months?
[Numerical value]

The intensity of the use of health care services is the sum of the contacts with the different health care providers. We do not take account of potential differences in the severity of the health care that is provided by certain health care professionals.[110]

We calculate the mean number of contacts with a health care provider (mean intensity). In addition, we construct a categorical variable that distinguishes between a low, a moderate and a high intensity of the use of health care services. Respondents with less than six contacts with health care providers during the last year have a low intensity of use (on average less than one contact every two months); respondents with six to 12 contacts during the last year have a moderate intensity of use (on average less than one contact every month); and respondents with more than 12 contacts with health care providers have a high intensity of use (on average more than one health care contact a month).

Table 9.5 shows the unweighted distribution of the research population by the intensity of the use of health care services. The majority of the research population has a low intensity of health care services use with one to six contacts with health care providers during the last year (51%). About 24% of the research population has a moderate intensity of health care services use, and 21% of the research population on average has had contact with a health care services more than once a month (high intensity). About 4% of the research population did not have any contact with a health care provider.

Table 9.5. Distribution of the research population by the intensity of health care services use (unweighted, 2007)

Intensity	Number of contacts	N	%
No	0	72	4
Low	1-6	865	51
Moderate	7-12	402	24
High	>12	353	21
Total		**1692**	**100**

Source: Author's calculations based on SHARE data wave 2

[110] For example, having had contact with a general practitioner is accounted in the same way as having had contact with a specialist, although it could be expected that the respondent who has had contact with a specialist is confronted with a more severe health problem than a respondent who only has had contact with a general practitioner. However, to take account of such differences we would have to ascribe weights to the different types of health care. In our opinion, it is not possible to calculate the correct weight of the different health care services because this would imply that we have exact information on why a respondent has had contact with a health care provider. Moreover, health care professionals provide different types of care, that differ in perceived intensity. For example, one can consult a dermatologist for an annual routine check-up (low degree of severity) or for a potential skin cancer (high degree of severity). Because taking account of these differences would lead us to far from our initial research goals, we have opted not to make a difference in the intensity of the health care contacts.

2.2 Intensity of social care services use

Secondly, we assess the intensity of the use of social care services. This is based on the number of hours the respondent has received social care during the last twelve months. Information on this is included in the SHARE modules on health care (hc) and social support (sp).

The SHARE module on health care includes five questions on the intensity of the use of formal care services. We estimated the hours of formal care with ADL the respondent received taking account of the number of weeks he or she received this type of care (hc033) and the average hours of care per week he or she received (hc034). We did the same for the receipt of formal care with IADL (number of weeks: hc035; and average hours per week: hc036). Note that hours were always rounded up to full hours.[111] We also took account of the receipt of meals-on-wheels: The assumption was made that the receipt of meals-on-wheels is equal to a time investment of half an hour per day, five days a week in the weeks receiving this service.

hc033 During the last twelve months, how many weeks did you receive professional or paid nursing care in your own home?
[Numerical value]

hc034 On average, how many hours per week did you receive professional or paid nursing care at home?
[Numerical value]

hc035 During the last twelve months, how many weeks did you receive professional or paid help for domestic tasks at home because you could not perform them yourself due to health problems?
[Numerical value]

hc036 On average, how many hours per week did you receive such professional or paid help?
[Numerical value]

hc037 During the last twelve months, how many weeks did you receive meals-on-wheels, because you could not prepare meals due to health problems?
[Numerical value]

Concerning the intensity of the use of informal care, the SHARE module on social support includes two questions. We estimated the hours of informal care the respondent received from an informal care provider from outside the household during the last year taking account of the periodicity (daily, weekly, monthly) (sp005) and the average number of hours of care received in this period (sp006). Again, hours were rounded up to full hours.

[111] This approach disguises periodical differences in the intensity of the receipt of social care services. It is not possible to distinguish periods with a high intensity of use versus periods with a low intensity of use.

sp005 During the last twelve months, how often altogether have you or your partner received such help from this person? Was this ...
1. Almost daily
2. Almost every week
3. Almost every month
4. Less often

sp006 About how many hours did you or your partner receive such help altogether (on a typical day/in a typical week/in a typical month) from this person?
[Numerical value]

Note that no information is available on the intensity of the use of informal care provided by a household member. This type of care is always considered as high intensity care, being daily or almost daily for a period of at least three months in the last year. We have accounted this in the variable on the intensity of the use of social care as the receipt of one hour of care per day during the last twelve months. This is added up to the other (formal and/or informal) care the respondent received.

Consequently, the intensity of the use of social care services refers to the estimated number of hours of formal and informal care received. It is the sum of the hours of formal care and the hours of informal care the respondent received during the last twelve months. Respondents that received less than one hour of care per week are considered as low intensity social care users. Respondents that received on average one to seven hours of care per week during the last twelve months are considered as moderate intensity care users. High intensity care users received on average more than seven hours of social care per week (at least one hour of care per day) during the last twelve months.

Table 9.6 shows the unweighted distribution of the research population by the intensity of the use of social care services. The population is limited to the part of the population that has actually received social care. Within this group, about 27% has a low intensity of care use (less than one hour per week). Almost 40% of the older care receivers received one to seven hours of care per week (moderate intensity) and about a third has a high intensity of care use (more than seven hours per week).

Table 9.6. Distribution of the research population, receiving social care services, by the intensity of care services use (unweighted, 2007)

Intensity	Weekly hours of care	N	%
No	0	2	0
Low	<1	159	27
Moderate	1-7	227	39
High	>7	193	33
Total		**581**	**100**

Note: 53 respondents were excluded because of missings on one of the intensity variables.

Source: Author's calculations based on SHARE data wave 2

An additional categorical variable was constructed to determine whether the respondent relies primarily on formal or on informal care. This is quite straightforward for elderly

relying exclusively on formal or on informal care. For elderly relying on both types of care, the intensity of formal and informal care is compared to assess whether they rely primarily on formal or on informal care services. When the intensity of the use of formal care services is larger than the use of informal care services, the respondent is assigned as relying primarily on formal care. Similarly, when the intensity of the use of informal care is larger than the use of formal care, the respondent is assigned as relying primarily on informal care. Table 9.7 shows the unweighted distribution of this variable. Almost 70% of the research population that receives social care relies exclusively on formal or informal care (resp. 20% and 48%). Among those receiving both types of social care, the majority relies primarily on informal care services (56%).

Table 9.7. Distribution of the research population, receiving social care, by the most important source of care (formal and/or informal) (unweighted, 2007)

Most important source of social care	N	%
Exclusively formal care	129	20
Both formal and informal care		
Primarily formal care	88	14
Primarily informal care	110	17
Exclusively informal care	306	48
Total	**633**	**100**

Note: 1 respondent was excluded because of missings on one of the intensity variables.

Source: Author's calculations based on SHARE data wave 2

3. Assessing the quality of the old age care package

We also wish to evaluate the quality of the old age care package. The quality of health and social care services proofs to be a complex, multidimensional and multifaceted object of research (Shekelle, MacLean, Morton, & Wenger, 2001; Sorenson & Mossialos, 2007; Wenger & Shekelle, 2001). Not only does it refer to the different levels at which care is provided, it also implies taking account of different care settings, diverse goals of care provision, a heterogeneous population with different values about care, several stakeholders, etc.

At the macro level, assessing the quality of care overall implies an evaluation of the legal quality norms, the encompassing quality assurance and quality improvement mechanisms, etc. At the micro level, the focus is on the quality of care from the viewpoint of the care receiver, which mainly comes down to the satisfaction of the care receiver with the care he/she received and the success in which the care received manages to improve the health status and/or functional level of the care receiver. In between the macro and the micro level, at the meso level, the quality of care refers to an assessment of the care providers offering health and social care services (Sorenson & Mossialos, 2007).

Moreover, the interpretation as well as the assessment of the quality of care is expected to differ between care settings: different quality standards and expectations exist for

example for the care provided in residential care settings versus the care provided at the house of the care receiver (Sorenson & Mossialos, 2007). Further, these quality of care examinations have to serve several goals. Not only can the results of these quality assessments be used to develop and evaluate standards on health and social care, they also have to enhance informed consumer choice and competition among care providers (Sorenson & Mossialos, 2007). In addition, we also wish to underline the potential role of these care quality assessments for the elderly population in that they have to contribute to safeguarding and guaranteeing the care receiver's wellbeing and to monitoring their protection against the functional dimension of old age dependency.

Several (sets of) indicators have been developed in attempts to grasp the complex nature of the quality of care. Researchers seem to agree that these indicators can be clustered in three broad groups: structural indicators, process indicators, and outcome indicators. The first group - structural indicators - focuses on the health care providers and facilities and their capacity to provide high quality care. This includes, among others, the facility's staff, safety, available technologies, etc. The second group - the process indicators - point to the actual use of the care services (performance, overuse and underuse). The last group, the outcome indicators, investigate whether the care received manages to influence the care receiver's health status in the intended direction. This includes, for example, the examination of one's health status after the receipt of a specific medical treatment. For the quality of social care services, however, according to Sorenson and Mossialos (2007) it is much more difficult to correctly measure this type of outcome, since there is a less direct link between the quality of the care services and changes in the functional level of the care receiver.

Given the aims of our research, we narrow our investigation to the quality of care at the level of the care receiver. This broadly comes down to two things: an objective assessment whether individuals with a specific need have received (appropriate) care, and a subjective evaluation of the care receiver's satisfaction with the care he or she received.[112] This has to be done both for health and social care services. Obviously, the use of the SHARE data limits us to the information included in the dataset.

[112] At the EU level, a set of indicators measuring health and long-term care has been developed as part of the European Strategy for Social Inclusion (European Commission Directorate Employment, Social Affairs and Equal Opportunities, 2009). The potentially interesting primary indicators are self-reported unmet need for medical care, and self-reported unmet need for dental care. In addition also the secondary indicators on self-perceived limitations with ADL and self-perceived general health status could be of interest. Yet, no such information is included in the second wave of the SHARE.

3.1 The quality of health care services

In the second wave of the SHARE, no information was collected on the patient satisfaction with the health care services received.[113] Consequently, in an attempt to assess the quality of the health care services we focus on the receipt of appropriate health care, more specifically whether respondents with specific health problems had contact with specialised health care providers for these health problems (3.1.1) and/or received appropriate medication for this condition (3.1.2).

3.1.1 Appropriate health care contacts

A first indicator assesses whether the respondent with a specific health problem has had contact with an appropriate specialist for this problem. For example, for a respondent who reports a chronic lung disease this implies having had contact with a pulmonary specialist. In this case, health care services are considered as successful, irrespective of the result of the health care received and irrespective of whether or not the respondent was satisfied with it.

[113] In the first wave of data collection, however, respondents were questioned on whether or not they had to forgo health care services because of specific reasons like the financial burden, the unavailability of care services at the moment of need, etc.

Table 9.8. Matching health problems (based on item ph006) to contacts with specialists (based on item hc004) to assess health care quality[114]

Specialist	Type health problem	
Cardiologist	Cardiological	Hearth attack, including myocardial infarction, coronary thrombosis, congestive heart failure, etc.
		Hypertension
		High blood cholesterol
		Stroke or cerebrovascular disease
Long specialist	Pulmonary	Chronic lung disease
		Asthma
Gastroenterologist	Gastro intestinal	Stomach or peptic ulcer
Endocrinologist	Endocrinological	Diabetes
Neurologist	Cerebrovascular	Stroke or cerebrovascular disease
	Neurological	Parkinson
		Alzheimer's disease, dementia, organic brain syndrome, etc.
Ophthalmologist	Vision	Cataract
Rheumatologist	Musculoskeletal	Arthritis, rheumatism
		Osteoporosis
Orthopaedist	Musculoskeletal	Hip fracture
		Other fractures
Oncologist	Cancer	Cancer or malignant tumour
Geriatrician	Neurological	Parkinson
		Alzheimer's disease, dementia, organic brain syndrome, etc.
	Musculoskeletal	Osteoporosis

Based on the matching of specific health problems with specialist contacts (Table 9.8), we were able to calculate the actual number of successful matches and compare this to the potential successful matches[115], which indicates the ratio of success:

$$succes_{health\ care} = \frac{successfull\ match\ health\ problem - specialist\ contact}{potential\ successful\ matches\ health\ problem - specialist\ contact}$$

When the ratio of success equals one, this means that the older person has had contact with an appropriate specialist for every health problem included in the list in the previous table. A ratio of success close to zero implies that the older person hardly had any contact with a (suited) specialist for his/her health problems. The success ratio of health care contacts is transposed to a categorical variable with four categories: never successful (ratio equals zero), sometimes successful (ratio larger than zero, but smaller than 0.5),

[114] One should note that benign tumour cannot be assigned to one specific specialist. Further, not all specialists in item hc004 are included here, because health problems related to their competence are not questioned. This holds for dermatologist, ear, nose and throat specialist, surgeon, psychiatrist, gynaecologist, and urologist.

[115] The number of potential successful matches refers to the maximum number of successful matches one could have had in case he/she would have had contact with an appropriate specialist for every health problem.

most of the times successful (ratio larger than 0.5, yet smaller than one), and always successful (ratio equals one).

Table 9.9 shows the unweighted distribution of the research population by the ratio of successful health care contacts. We find that for about 32% of the respondents there always was a successful match between the health status and the services received (ratio = 1). However, for 29% of the research population there never was a successful match between health status and health care services (ratio = 0).

Table 9.9. Distribution of the research population by the ratio of success of health care contacts (unweighted, 2007)

Successful health care contacts	Ratio	N	%
Never	Ratio = 0	234	29
Sometimes	0 < Ratio < 0.5	91	11
Most of the times	0.5 ≤ Ratio < 1	219	27
Always	Ratio = 1	260	32
Total		**804**	**100**

Note: The successful match between health problems and health care contacts is only computed for respondents that had contact with a second-line health care provider. We were able to compute the success ratio for about 84% of this group of respondents.

Source: Author's calculations based on SHARE data wave 2

3.1.2 Appropriate medication

In addition, health care services are also considered as successful when respondents with a specific health care problem received appropriate medication for this problem. The following question (ph011) in the SHARE module on physical health investigated the use of medication for several medical conditions:

ph011 Our next question is about the medication you may be taking. Please look at card 10. Do you currently take drugs at least once a week for problems mentioned on this card? *(multiple answers possible)*
1. Drugs for high blood cholesterol
2. Drugs for high blood pressure
3. Drugs for coronary or cerebrovascular diseases
4. Drugs for other hearth diseases
5. Drugs for asthma
6. Drugs for diabetes
7. Drugs for joint pain or for joint inflammation
8. Drugs for other pain (e.g. headache, back pain, etc.)
9. Drugs for sleep problems
10. Drugs for anxiety or depression
11. Drugs for osteoporosis, hormonal
12. Drugs for osteoporosis, other than hormonal
13. Drugs for stomach burns
14. Drugs for chronic bronchitis
96. None
97. Other drugs, not yet mentioned

We matched the respondent's health problems with his/her medication use (see Table 9.10). Note that only for a limited number of health problems we were able to identify specific medication. For several reasons, a number of health problems are not reflected univocally in the receipt of medication. For example, hip fracture is prone to an operation rather than to medication. In addition, certain types of medication cannot be univocally ascribed to a specific health problem (e.g. item 8 in ph011: drugs for other pain). Also, the focus on the current use of medication makes it impossible to determine whether the respondent has received medication for a specific health problem in the past, but was no longer taking it at the moment of interview. Lastly, it is possible that a respondent with multiple pathologies does not receive medication for each single health problem because the combination of different drugs can lead to adverse drug reactions. Consequently, the doctor can decide not to prescribe medication for each health problem when the risk for drug interaction is too large (French, 1996).

Again, in the matching of the health problems and the receipt of medication no reference is made to whether the treatment was successful, and whether the respondent was satisfied with the treatment and its results.

Table 9.10. Matching health problems (based on item ph006) to medication use (based on item ph011) to assess health care quality

Health problem	Medication
Hearth attack, including myocardial infarction, coronary thrombosis, congestive heart failure, etc.	Drugs for coronary or cerebrovascular diseases Drugs for other hearth diseases
Hypertension	Drugs for high blood pressure
High blood cholesterol	Drugs for high blood cholesterol
Stroke	Drugs for coronary or cerebrovascular diseases
Diabetes	Drugs for diabetes
Chronic lung disease	Drugs for chronic bronchitis
Asthma	Drugs for asthma
Arthritis, rheumatism	Drugs for joint pain or for joint inflammation
Osteoporosis	Drugs for osteoporosis
Stomach or peptic ulcer	Drugs for stomach burns

Again, we compare the number of successful matches between the use of medication and a health problem with the potential number of successful matches to get the ratio of success on the receipt of medication:

$$succes_{medication} = \frac{successfull\ match\ health\ problem - medication}{potential\ successful\ matches\ health\ problem - medication}$$

A ratio of success approaching one indicates that the respondent nearly always has received appropriate medication for a specific health problem, while a success ratio close to zero indicates that the respondent hardly ever receives appropriate medication. The success ratio is transposed to a categorical variable with four categories: never successful (ratio equals zero), sometimes successful (ratio larger than zero, but smaller than 0.5),

most of the times successful (ratio larger than 0.5, yet smaller than one), and always successful (ratio equals one).

Table 9.11 shows the unweighted distribution of the research population by the ratio of success of the medication they received. About 54% of the research population always received appropriate medication for a given condition, and 28% most of the time received appropriate mediation. Only 14% never received appropriate medication for a health condition.

Table 9.11. Distribution of the research population by the ratio of success of medication (unweighted, 2007)

Successful medication	Ratio	N	%
Never	Ratio = 0	183	14
Sometimes	0 < Ratio < 0.5	47	4
Most of the times	0.5 ≤ Ratio < 1	367	28
Always	Ratio = 1	700	54
Total		**1297**	**100**

Note: The successful match between health problems and medication is only computed for respondents that used medication in the last year.

Source: Author's calculations based on SHARE data wave 2

3.1.3 Reflections on the health care quality indicators

We are fully aware of the suboptimal character of the assessment of the quality of the health care services presented in the previous section. More importantly, the quality of health care is limited to the receipt of appropriate health care, because of the lack of sufficient information to assess the quality of the health care services received more in detail. In addition, the following limitations should be kept in mind when interpreting the results.

First, we cannot quantify a solid relationship between the respondent's health status and the contact with a specialised health care provider. It is not possible to rule out that a respondent had contact with other health care providers, or that he/she had contact with a health care provider for another health problem. Secondly, we cannot assess the actual result of the health care services received. It is not possible to identify whether the treatment or the medication was successful or not. Thirdly, we cannot evaluate the respondent's satisfaction with the services and medication he or she received. Fourth, we cannot identify whether the respondent has had contact with different specialists for one health problem. Fifth, only for a smaller part of the research population we were able to match the health care services use to a specific health condition. Also, the health care services included in the analysis are limited to contacts with specialists. It is not possible to estimate the success ratio of respondents with specific health problems that only had contacts with first-line health care providers.

All these limitations mainly are the result from limitations in the SHARE data. No information is collected on the patient satisfaction, on whether or not the older person had to forego certain types of health care, the lack of precise information to match health problems and health care services, etc. Working with more detailed health data could be a solution, yet, even than the quality of health care services remains a difficult concept to measure.

3.2 The quality of social care services

As discussed before, the quality of social care is a concept that is difficult to measure. We focus on three quality dimensions: the receipt of appropriate care, the patient satisfaction with the care received, and the patient satisfaction with the care provider.

3.2.1 Receipt of personal care and home help

A first indicator focused on whether elderly reporting limitations with ADL or IADL actually received resp. personal care or home help. A match between having limitations and receiving care is successful when elderly reporting at least one limitation with ADL (based on ph049 items 1 to 6) received personal care and when elderly with at least one IADL limitation (based on ph049 items 7 to 13) received home help.[116] The operationalisation of the receipt of personal care and home help is included in section 1.3.

Table 9.12 shows the unweighted distribution of the research population that receives social care by whether or not they receive appropriate care (i.e. care adapted to their limitations with ADL and/or IADL). Among the respondents with ADL limitations only 37% received personal care. About 63% did not receive personal care. Among the research population with limitations in their IADL, the majority received appropriate home help (66%).

[116] See appendix 7 for more information on the operationalisation of limitations with ADL and IADL.

Table 9.12. Distribution of the research population receiving social care by the match between the care received and limitations with ADL and IADL (unweighted, 2007)

	Successful		Not successful	
	N	**%**	**N**	**%**
Personal care	107	37	179	63
Home help	256	66	132	34

Note: Only respondents with limitations in their ADL and/or IADL are included here.

Source: Author's calculations based on SHARE data wave 2

3.2.2 Satisfaction with social care

A second indicator focuses on the satisfaction of the care receiver with the social care services he or she received. This is based on a subjective assessment of whether or not the care received meets the needs of the care receiver. Information on this is questioned in the SHARE module on physical health: question ph050 focuses on the receipt of social care, and question ph051 on whether or not this care meets the needs of the respondent.

ph050 Thinking about the activities that you have problems with, does anyone ever help you with these activities?
1. Yes
5. No

ph051 Would you say that the help you receive meets your needs?
1. All the time
2. Usually
3. Sometimes
4. Hardly ever

Table 9.13 shows the unweighted distribution of the research population that receives social care services by how satisfied they are with the services they received. We see that the majority of the care receivers is quite satisfied: 93% of the research population states that the care they received most of the time or always met their needs. Only 7% claims that the social care services they received only sometimes or hardly ever met their needs.

Table 9.13. Distribution of the research population receiving social care by satisfaction with the care received (unweighted, 2007)

Patient satisfaction	**N**	**%**
Hardly ever	4	1
Sometimes	25	6
Most of the time	123	32
Always	237	61
Total	**389**	**100**

Note: Only respondents with limitations in their ADL and/or IADL are included here.

Source: Author's calculations based on SHARE data wave 2

3.2.3 Preferences on the main care provider

A third indicator focuses on the expectations of the care receiver and whether the care he or she received corresponds to these expectations. In the SHARE this is translated into the expectations on who has the main responsibility in the provision of social care: the family or the state. A difference is made between personal care and home help. This question is included in the drop-off questionnaire (q7):

> **q7** In your opinion, who - the family or the State - should bear the responsibility for each of the following:
> B. Help with household chores for older persons who are in need such as cleaning, washing
> C. Personal care for older persons who are in need such as nursing or help with bathing or dressing
>
> 1. Totally family
> 2. Mainly family
> 3. Both equally
> 4. Mainly state
> 5. Totally state

We compare the most important caregiver (cf. 2.2: primary caregiver) with the respondent's preference on who should provide this type of care. When both correspond to each other, there is a successful match between the respondent's preference and the type of care he or she receives. For example, there is a successful match if a respondent who thinks the state should provide personal care, receives personal care from a formal caregiver. Elderly claiming an equal responsibility to the family and the state in care only have a positive match between the care they receive and their preference if they receive care from both formal and informal caregivers.

Table 9.14 shows the unweighted distribution of the research population receiving social care services on the match between the care they receive and their preference on who should provide this care. As shown, both for personal care and for home help the majority of the research population received care according to their preferences (resp. 68% for personal care and 65% for home help).

Table 9.14. Distribution of the research population receiving social care services by the match between the care they receive and their preference on who should provide this care (unweighted, 2007)

	Successful		Not successful	
	N	%	N	%
Personal care	114	68	54	32
Home help	261	65	139	35

Note: Only respondents with limitations in their ADL and/or IADL, that receive social care services, without missing information on one of the variables (i.e. type of care received, caregiver, and preference on who should provide care) are included here.

Source: Author's calculations based on SHARE data wave 2

3.2.4 Reflections on the social care quality indicators

We are fully aware of the suboptimal character of the assessment of the quality of the social care services presented in the previous section. We limited our investigation to three dimension of care quality. In addition, the following limitations should be kept in mind when interpreting the results.

First, as was the case with the indicators on the quality of health care, no account is given to the efficiency or the effectiveness of the care services received. We do not assess whether the care received improves the respondent's functional level, because information to do so is not available in the SHARE. Moreover, according to Sorenson and Mossialos (2007) it is unclear whether the quality of care services should be assessed in this way, because improving the functional status is not always the main objective of social care provision.

Second, the first indicator that matches the receipt of social care services with whether or not the respondent has limitations with ADL and/or IADL does not take account of the overall respondent's preferences on the receipt of social care. We cannot assess if a mismatch (i.e. the respondent has ADL and/or IADL limitations but does not receive appropriate care) is the result of the unavailability of appropriate care or of the reluctance of the respondent on receiving this type of care.

4. Conclusion

In this chapter the operationalisation of the care package was discussed. Both the use of health care services and the use of social care services is included. A cluster analysis, based on the different care services questioned in the SHARE, was used to determine the existence of care packages. Seven hierarchical care packages were discerned, ranging from a care package with minor care use to a diverse, complex care package including both health and (formal and informal) social care services. In addition, we operationalised the intensity of the use of health and social care services. This refers resp. to the number of contacts the respondent had with a health care provider during the last year, and the hours of social care received during the last year. Lastly, some indicators on the quality of the care package were developed. This includes for example the match between health conditions and medication, and the receipt of social care that is adapted to the preferences of the care receiver.

In the next chapter, we present the research results on the old age care package. Our main focus is on the relationship between the old age income and care package, and on the protection the old age care package provides against the functional dimension of old age dependency.

CHAPTER 10

THE OLD AGE CARE PACKAGE UNRAFFLED[117]

[117] A part of this chapter is based on: Verpoorten, R. (2014). *The reproduction of income inequality in the use of health and long-term care services? An investigation into the (success) story of the national health insurance scheme for the Belgian elderly population*. Paper presented on the 12th Annual ESPAnet Conference, 4-6 September, Oslo, Norway.

CHAPTER 10. THE OLD AGE CARE PACKAGE UNRAFFLED

In chapter 8 we investigated the protection against the financial dimension of old age dependency. The focus was on the old age income package and the extent to which this provides protection against financial deprivation in old age. In this chapter, we focus on another important dimension of old age dependency: the functional dimension and the risk on long-term functional dependency. We investigate the health and social care services that could provide protection against this dimension of old age dependency. We explore the composition of the care package of the Belgian elderly population, with specific attention for the relationship between the old age income package and the old age care package. More specifically, we concentrate on the reproduction of inequalities in the old age income package into the care package. The following research questions are addressed:

RQ 2a. How is the old age care package composed?

RQ 2b. What is the intensity of the use of health and social care services?

RQ 2c. What role does the old age income package play in explaining the composition of the care package and the intensity of the care services utilisation?

RQ 3b. What role does the old age care package play in providing protection against the functional dimension of old age dependency?

RQ 3c. What role does the old age income package play in providing protection against the functional dimension of old age dependency?

In addition, we formulated four specific hypotheses:

H1. Elderly with a more generous and/or a more diverse income package are expected to have a more diverse care package than elderly with a less generous and/or a less diverse old age income package, when controlling for health status and functional level.

H2. Elderly with a more generous and/or a more diverse income package are expected to have more contact with specialists than elderly with a less generous and/or a less diverse old age income package, when controlling for health status and functional level.

H3. Elderly with a more generous and/or a more diverse income package are expected to rely more on formal care, while elderly with a less generous and/or a less diverse old age income package are expected to draw more on informal care, when controlling for health status and functional level.

H4. Elderly with a more generous income package are expected to have a higher intensity of health and social care services use than elderly with a less generous income packages, when controlling for health status and functional level.

H5. Elderly with a more diverse care package are expected to enjoy higher levels of protection against the functional dimension of old age dependency than elderly with a less diverse care package, when controlling for health status and functional level.

H6. Elderly with a more generous income package are expected to enjoy higher levels of protection against the functional dimension of old age dependency than elderly with a less generous income package, when controlling for health status and functional level.

In the first section of this chapter, the broad research strategy for the analysis of the health and social care package of the elderly population is discussed. In the second section we describe the composition of the care package and the intensity of the use of health and social care services. In section 3, we investigate the relationship between the income package and the care package. We explore whether differences in the care package composition and in the intensity of the use of care services are related to differences in the generosity and the composition of the old age income package. In section 4, we present a number of logistic regression models investigating the link between the care package and the income package when controlling for differences in the health status, functional level and the sociodemographic and socioeconomic background of the individuals. In section 4.1, we test the overall care package composition, while in sections 4.2 and 4.3 we focus on the use of health care services and social care services. The same is done for the intensity of the use of care services in section 5. In the last section, we explore the quality of the health and social care services used by the Belgian elderly population. Based on different indicators (see chapter 9), we search for a link between the old age income package and the quality of the old age care package. Do elderly with more generous old age income packages dispose of higher quality health and social care services than elderly with less generous old age income packages?

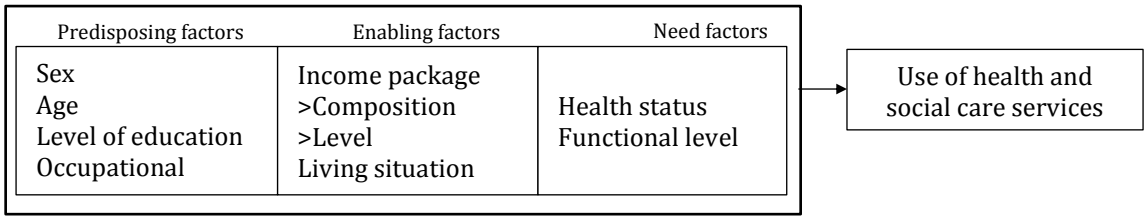
1. Overall research strategy

To assess the protection provided by the care package, account is given to a number of background determinants, generally acknowledged as influencing the use of health and social care services. This is to control for their potential influence when investigating the relationship between the care package and the income package.

To decide on which background variables should be included in the models, we draw on the seminal health care utilisation framework of Andersen and Newman (1973). This

framework explains the use of health care from three types of factors: predisposing, enabling and need factors.[118] The predisposing factors included here are mainly sociodemographic and socioeconomic determinants: sex, age, level of education and former employment status. Among the enabling factors, the focus is on the old age income package, including not only personal income sources but also asset sources. Attention is given to the generosity and the composition of the income package. Further, also the living situation (either or not living together with a partner) is included as a factor inducing the access to care. Concerning the need factors, account is given to the health status and the functional level to control for need differences (i.e. differences in health status and functional level) among the elderly population (see Figure 10.1). Two dimensions of the health and social care package are assessed: the use of the care services and the intensity of this use. In addition, we also assess the quality of the care package.

Figure 10.1. The care package: Conceptual scheme



One should note that no account is given to the availability of care services. In chapter 4 of this dissertation the regional organisation of care services was sketched, but in the empirical analyses we will not include the potential influence of the supply side of health and social care on the use of these services, because we wish to focus on the role of the old age income package in explaining differences in the use of health and social care services. Including the supply of care services in, for example, a multilevel research design would shift our attention away from our main research questions. Yet, in reading and interpreting the research results one must keep in mind that differences in the availability and presence of care services can induce differences in the use of these services.[119]

Descriptive and exploratory statistical techniques are applied to map the use of care services and the intensity of this use. The distributions of the categorical variables and their mutual relationships are displayed in cross tables. The appropriate test statistics are calculated to explore whether the observed relations are statistically significant. In addition, multivariate models are used to explain the composition of the care package and the intensity of the care use. To control for differences in the sociodemographic and socioeconomic background of the research population, we include the main background

[118] The health care utilisation framework of Andersen and Newman (1973) is discussed more in detail in chapter 4 of this dissertation.
[119] See for example the research of Declercq et al. (2009) on this topic.

variables in the models (i.e. sex, age, level of education, occupational status, living situation, health status and functional level). Our central focus, however, is on the role of the old age income package. The choice of the appropriate techniques depends on the character of the dependent variables (i.e. categorical of metric). More details on this are provided in the relevant sections.

2. The old age care package

In this section, we explore the old age care package of the Belgian elderly population. First, we address the composition of the care package (2.1) and the intensity of the use of health and social care services (2.2). We also investigate whether there is a relationship between the intensity of use and the composition of the care package (2.3). Secondly, we pay attention to a number of sociodemographic and socioeconomic background variables to give a first indication of potential vulnerable groups.

Note that the potential influence of the income package on the care package is not addressed here, because this is discussed in detail in section 3.

2.1 Composition of the old age care package

In this first section, we focus on the composition of the care package. Table 10.1 shows the weighted distribution of the research population by the care package composition, based on the hierarchical care clusters (see chapter 9). About 29% of the research population has a minor care use, whereas 23% of the elderly combines first- and second-line health care services. 36% of the research population relies to an important extent on care services, provided by either formal or informal caregivers. For 23% of the research population home help services are dominant: about 14% relies primarily on informal home help, while 9% mainly receives home help from formal caregivers. A minority of the research population depends largely on informal personal care services (4%), while 9% combines several health and social care services (mixed care package).

Table 10.1. Distribution of the research population by care package composition (weighted, 2007)

Care package	N	%
Minor care use	486	29
Second-line health care	374	23
Hospital care	205	12
Informal home help	231	14
Formal home help	141	9
Informal personal care	69	4
Mixed care package	145	9
Total	**1651**	**100**

Source: Author's calculations based on SHARE data wave 2

2.2 Intensity of care use

Secondly, we investigate the intensity of the care use. Table 10.2 gives the weighted distribution of the research population by the intensity of their health, resp. social care services use. A difference is made between a low (1 to 6 health care contacts per year / less than 1 hour of care per week), a moderate (7 to 12 health care contacts per year / 1 to 7 hours of care per week) and a high intensity of utilisation (13 or more health care contacts per year / more than 7 hours of care per week). In addition, Table 10.2 also shows the mean and the median intensity of use, expressed in number of contacts with health care services and the number of hours of social care services received.

Table 10.2. Relative distribution of the research population by the intensity of health and social care services use (weighted, 2007)

	Health care services	Social care services
Mean	8	8
Median	6	3
Intensity of use (%)		
No	4	65
Low	52	10
Moderate	23	14
High	20	11
Total (N=100%)	**1697**	**1604**

Note: The mean (resp. median) intensity of health care services refers to the average (resp. median) number of contacts the respondent had with a health care provider during the last year. The mean (resp. median) intensity of social care services refers to the average (resp. median) number of hours of social care services received during the last year, on a weekly basis.

Source: Author's calculations based on SHARE wave 2

The majority of the research population has a low intensity of health care services use: 52% had only one to six contacts with a health care provider during the last year. About 20% had a quite intense use of health care services, with on average more than monthly visits to a health care provider. Only 4% of the research population did not have any

contact with a health care provider during the last year. On average, the research population had eight contacts with a health care provider during the last year.

Concerning social care, the majority of the research population did not receive social care services during the last year (65%). About 35% of the research population reports the use of this type of care services. Within this group of social care receivers, about 28% gets less than one hour of care per week, and 39% receives one to seven hours of care per week. About 31% of the care receivers is considered as intense users of these services, and receives one average more than one hour of care per day. On average, the older care receivers receive about eight hours of care per week, which is quite high. However, 50% of the care receivers gets a maximum of three hours of social care services per week.

2.3 Composition of the care package versus the intensity of use

In addition, we also investigate whether a relationship exists between the intensity of care services use and the composition of the care package. According to Van Vliet et al. (2010), a higher degree of diversity in the care package indicates a higher degree of care dependency, that on its turn is related to a higher intensity of care services use. Consequently, more diverse care packages are expected to go hand in hand with a higher intensity in care services use. This is confirmed in the SHARE data. Table 10.3 shows the average intensity of health and social care services use by the composition of the care package. We see that the average intensity of use increases when the care package becomes more complex. For example, elderly with a minor care package on average had 4 contacts with a health care provider and received no social care services, while a respondent with a mixed care package had 16 contacts with a health care provider and received 15 hours of social care services per week.

Table 10.3. Mean intensity of health and social care services use by the care package composition (weighted, 2007)

	Mean intensity of use	
Care package	**Health care services (contacts)**	**Social care services (hours/week)**
Minor care use	4	0
Second-line health care	6	0
Hospital treatment	9	0
Informal home help	8	4
Formal home help	12	7
Informal personal care	17	14
Mixed care package	16	15
Total	**8**	**8**

Note: The mean intensity of health care services refers to the average number of contacts the respondent had with a health care provider during the last year. The mean intensity of social care services refers to the average number of hours of care received during the last year, on a weekly basis.
Note: Both for the intensity of health care services use and the intensity of social care services use the differences between the care packages are found to be statistically significant ($p<0.0001$) (according to the Kruskal-Wallis Chi^2 test statistics).

Source: Author's calculations based on SHARE wave 2

2.4 Tracing vulnerable groups

Lastly, we explore the existence of vulnerable groups regarding the care package and the intensity of the use of health and social care services. In doing so, we include the following sociodemographic and socioeconomic background variables: sex, age, living with partner, occupational status and level of education. Because health status and functional level are essential in explaining the use of health and social care services (cf. Andersen & Newman, 1973), we also address a number of health status and functional level variables. Note that income is not addressed here, because we will investigate this more in depth in the next section.

Table 10.4 shows the weighted relative distribution of the research population by the care package composition and by a number of relevant socioeconomic and sociodemographic background variables. The following interesting findings pop out. First, women tend to have more complex care packages than men: 41% of the female research population relies to some extent on social care services, compared to only 29% of the male research population. Secondly, the positive relationship between age and the composition of the care package is proven in that the research population above 75 years overall has more diverse care packages than the research population between 60 and 74 years. This is explained by the fact that getting older is positively related to having a higher degree of physical dependency. Thirdly, high-status elderly are stronger represented in the second-line health care package than lower-status elderly. For example, 30% of the elderly with a high occupational status (salariat) and 30% of the elderly with a high level of education belong to the second-line health care package, compared to only 16% of the elderly with a low occupational status and 18% of the low-educated elderly. Potentially, this is explained

by the fact that status is associated with income and that a higher income generates more possibilities to pay for the more expensive second-line health care providers. However, status can also be associated with knowledge: high-status elderly have more knowledge about the medical system and therefor have a lower burden in contacting a second-line health care provider. Lastly, singles are overrepresented in the more complex care packages and rely more on formal social care services than elderly living with a partner. For example, 15% of the single respondents belong to the "formal home help" package, compared to only 5% of the respondents with a partner. In addition, 5% of the respondents living with a partner have an "informal personal care" package, compared to only 2% of the single-living elderly. Possibly this is explained by the fact that single-living elderly cannot draw on the informal care provided by the partner, and thus more often rely on formally provided care.

Table 10.4. Relative distribution of the research population by the care package composition and by sex, age, occupational status, level of education and living situation (weighted, 2007)

	Care package (%)							
	Minor	Second-line	Hospital	Informal home help	Formal home help	Informal personal care	Mixed	**Total (N=100%)**
Sex								
Male	32	23	15	13	6	5	6	741
Female	27	22	10	15	11	4	11	910
Age								
60-74	34	26	14	13	4	4	6	1074
75+	21	16	9	16	18	5	14	577
Occupational status								
Salariat	29	30	14	11	5	4	8	550
Intermediate	29	22	11	15	12	4	7	386
Working class	32	16	12	17	8	5	10	467
None	29	18	11	13	11	5	12	184
Education								
High	30	30	14	11	7	3	5	354
Intermediate	29	23	13	14	9	4	8	758
Low	30	18	10	16	8	5	12	524
Living situation								
Couple	34	26	14	10	5	5	6	1079
Single	21	17	9	22	15	2	14	571
Total	**29**	**23**	**12**	**14**	**9**	**4**	**9**	**1651**

Note: The relationship between the care package composition and all the background determinants is statistically significant (p <0.0001) (based on the Pearson Chi^2 test statistics).

Source: Author's calculations based on SHARE wave 2

Table 10.5 shows the mean intensity of care use by sex, age, occupational status, level of education and living situation. For health care services, this expresses the average number of contacts with a health care provider one had during the last year. For social care services, this expresses the average hours of social care services received per week in the last year.

Women, the oldest elderly, low-status elderly and singles on average have a higher intensity of health care services use than men, elderly between 60 and 74 years, high-status elderly, and elderly living with a partner. The same is found for the intensity of the use of social care services. To a certain extent this is the result of the relationship between the complexity of the care package and the intensity of the use of care services (cf. supra).

Table 10.5. Mean intensity of care use by sex, age, occupational status, level of education and living situation (weighted, 2007)

	Mean intensity of use			
	Health care services		Social care services	
	Mean number of contacts	*p*	Mean hours/week	*p*
Sex				
Male	8	0.0171	6	0.1475
Female	9		10	
Age				
60-74	7	<0.0001	5	<0.0001
75+	10		11	
Occupational status				
Salariat	7	0.0022	6	<0.0001
Intermediate	8		6	
Working class	9		9	
None	10		16	
Education				
High	7	<0.0001	5	<0.0001
Intermediate	8		6	
Low	10		12	
Living situation				
Couple	8	<0.0001	7	0.3299
Single	10		9	
Total	**8**		**8**	

Note: The mean intensity of health care services refers to the average number of contacts the respondent had with a health care provider during the last year. The mean intensity of social care services refers to the average number of hours of social care received during the last year, on a weekly basis. Only respondents actually using the services were included in the calculations.

Source: Author's calculations based on SHARE wave 2

3. Investigating the relationship between the income package and the care package

In this section, we investigate whether a relationship exists between the income package and the care package, a central question in this research. More specifically, links between the generosity and the composition of the income package on the one hand, and the composition and intensity of the care package on the other hand are investigated. It is expected that elderly with so-called 'rich' income packages differ from elderly with 'poor' income packages in their care use (both composition and intensity of use). Elderly with a more generous income package are assumed to have more access to health care, and have

a higher intensity of utilisation. Similarly, elderly with a more generous income package are supposed to have more and easier access to formal care services, while elderly with a less generous income package are compelled to the use of 'cheap' informal care.

Note that we make a difference between the old age income package containing only personal income sources, and the extended old age income package, which includes also the available income from financial assets and property ownership.[120] The main reason for this is the availability of the income for consumption: the income from personal income sources is considered to be more directly available for short-term expenses and regular consumption goals. Spending on health and social care services is part of this. However, the available income from the extended income package is expected not to be used entirely for regular consumption, since a part is derived from financial assets and property ownership.

Further, one should also note that in this section we focus on the relationship between the care package and the income package without taking account of the potential influence of other background characteristics (like health and functional status, sex, age, etc.). In sections 4 and 5 of this chapter, we present a number of multivariate regression models including other background characteristics besides the old age income package to present a broader picture of the variables influencing the health and old age care package.

In section 3.1, we focus on link between the income package and the composition of the care package. In section 3.2, we focus on the relationship between the income package and the intensity of the use of health and social care services.

3.1 The care package composition along the lines of the old age income package

The investigation of the relationship between the care package composition and the old age income package is twofold.

On the one hand, we investigate whether the care package composition is related to the generosity of the old age income package (section 3.1.1). The hypothesis is that more generous income packages result in more diverse care packages, mainly because elderly with a more generous old age income package have more means to buy in care services. Further, we distinguish between the use of health care services and the use of social care services. Concerning the use of health care services, we expect that elderly with more generous income packages rely more on second-line health care providers than elderly with less generous income packages. Concerning the use of social care services, we expect that elderly with less generous income packages have to draw more on 'cheap' informal

[120] More information on the composition of the old age income package, as well as the calculation of the level of income is included in chapter 7.

care, while elderly with more generous old age income packages have more opportunities to buy in care and thus rely more on formal care providers.

On the other hand, a link between the composition of the old age income package and the care package is investigated (section 3.1.2). The main hypothesis is that more diverse old age income packages go hand in hand with more diverse care packages.

3.1.1 The care package composition versus the generosity of the old age income package

First, we investigate the overall relationship between the care package composition and the level of income protection from the income package. To recall, the personal income package includes only income sources with personal ownership, like pensions and social security benefits. The extended income package includes the income from personal income sources, and the available income from financial assets (via interests) and from secondary residence (rental income). All incomes are calculated on a monthly basis and are made equivalent to take account of the returns of scale from living together with a partner.

Table 10.6 shows the mean and median income from the personal and the extended old age income package by the different configurations of the care package. Also a difference is made by the use of health care services (only first-line health care or a combination of first- and second-line health care services) and the use of social care services (formal vs. informal care services).

First, we find that the generosity of the old age income package tends to decrease when the complexity of the care package increases. There seems to be a negative relationship between the generosity of the income package and the care package composition. In addition, elderly with a second-line health care package have the most generous old age income package, irrespective of the type of income sources included. The mean equivalent income from the personal income package of this group of elderly is 1596 Euros per month; when assets are included the mean income increases to 1771 Euros per month. Elderly with the highest degree of diversification in their care package proof to have the least generous old age income package. On average, elderly with a mixed care package receive 1026 Euros per month from the personal income package. When assets are included, the average income from the old age income package increases to 1121 Euros per month. Yet, one must note that we do not take account of any differences in the health status and the functional level of the elderly population, so it is possible that this

relationship changes when we investigate the generosity of the income package for elderly with a similar health status and functional level.[121] This is addressed in section 4.

Secondly, concerning the use of health care services, elderly that only had contact with first-line health care providers on average have 1215 Euros from the personal income package, while the average income from personal income sources of elderly that combine contacts with first- and second-line health care providers is about 150 Euros higher (1364 Euros). Also when the income from the extended income package is considered, the expected income differences are confirmed. The average level of the extended income package of elderly with only first-line health care services is lower than that of elderly with first- and second-line health care services (resp. 1369 Euros per month vs. 1533 Euros per month).

Thirdly, little differences in the generosity of the old age income package of elderly that rely on formal care and elderly that rely only of informal care are found. Elderly combining formal and informal care have the least generous old age income packages.

[121] However, an exploratory bivariate analysis of the relationship between the care package and the income package of elderly that are actually confronted with limitations in their health status and functional level (limitations in ADL or IADL) indicates that there is no significant relationship between the care package and the composition or the generosity of the income package.

Table 10.6. Mean and median monthly equivalent net income from the personal and the extended income package by care package composition, use of health and social care services (weighted, 2007)

		Personal income package		Extended income package	
	N	Mean	Median	Mean	Median
Care package°					
Minor care use	454	1212	1034	1353	1127
Second-line health care	359	1596	1154	1771	1322
Hospital treatment	190	1399	1098	1630	1218
Informal home help	216	1160	1068	1318	1146
Formal home help	137	1182	1041	1372	1125
Informal personal care	65	1221	1091	1320	1176
Mixed care package	135	1026	1000	1121	1054
Health care services+					
Only first-line	603	1215	1049	1369	1126
First- and second-line	888	1364	1087	1533	1213
Social care services£					
Only formal care	120	1195	1077	1350	1192
Formal + informal care	177	1042	976	1180	1020
Only informal care	284	1192	1070	1339	1145

Note: The mean and median income from the extended income package refers to the income from personal income sources and the direct available income from assets (ie interest from financial assets and rental income from secondary residence).

° The income differences between the care packages are statistically significant for both the personal income package (p=0.0052) and the extended income package (p=0.0001) (according to the Kruskal-Wallis Chi^2 test statistics).

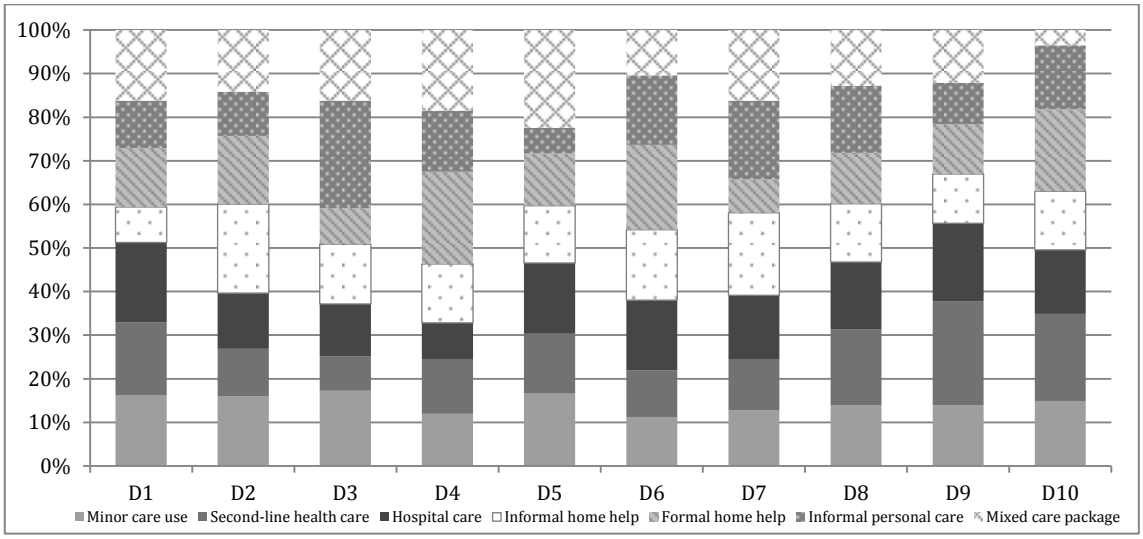
+ The income differences between the two groups of health care services are statistically significant for both the personal income package (p=0.0103) and the extended income package (p=0.0044) (according to the Kruskal-Wallis Chi^2 test statistics).

£ The income differences between the groups of social care services use are statistically significant for both the personal income package (p=0.0013) and the extended income package (p=0.0062) (according to the Kruskal-Wallis Chi^2 test statistics).

Source: Author's calculations based on SHARE wave 2

In addition, we investigate whether inequalities in the income distribution are reflected in the care package composition. How does the care package composition change along the income distribution? Because the differences between the personal and the extended old age income package are minor, we only present the personal income distribution (Figure 10.2). Although the relationship between the income distribution and the care package composition is not straightforward, we do see that elderly with a second-line health care package (grey bars) are somewhat overrepresented in the upper income deciles, while elderly with a mixed care package (checked bars) are stronger represented in the lower income deciles: 28% of the elderly with a second-line health care package has an income in D9 or D10, compared to only 10% of the elderly with a mixed care package. Similarly, elderly with an informal home help package (grey dotted bars) are also less presented in the upper part of the income distribution: only 16% of this group of elderly has an income in D9 or D10.

Figure 10.2. Care package composition by personal income decile distribution (weighted, 2007)[122]

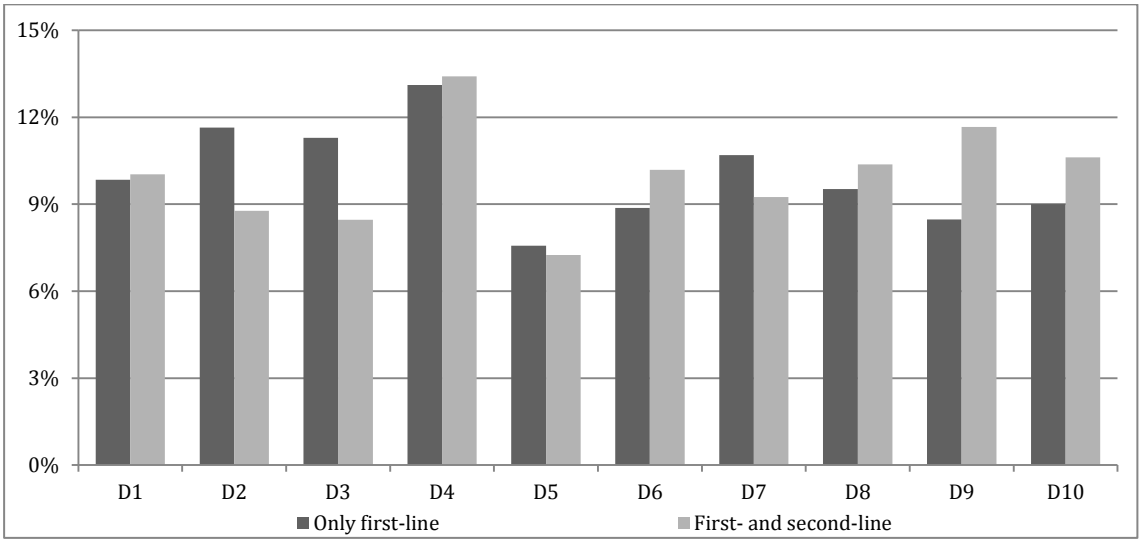


Source: Author's calculations based on SHARE wave 2

Figure 10.3 shows the use of health care services (first-line vs. first- and second-line health care services) along the income distribution. No clear trend is found. On the one hand, the combination of first- and second-line health care services increases from the first to the fourth income decile, but drops in the fifth income decile. The proportion of elderly combining first- and second-line health care again increases from the sixth to the tenth income decile. On the other hand, the proportion of elderly that only uses first-line health care services tends to decrease from the first to the fifth income decile, and again increases slightly from the sixth to the tenth income decile. As could be expected from these observations, the relationship between the income decile distribution and the use of health care services is not statistically significant.

[122] The differences between the income deciles are statistically significant (p=0.0003) (Based on the Pearson Chi^2 test statistic).

Figure 10.3. Health care services use by personal income decile distribution (weighted, 2007)[123]

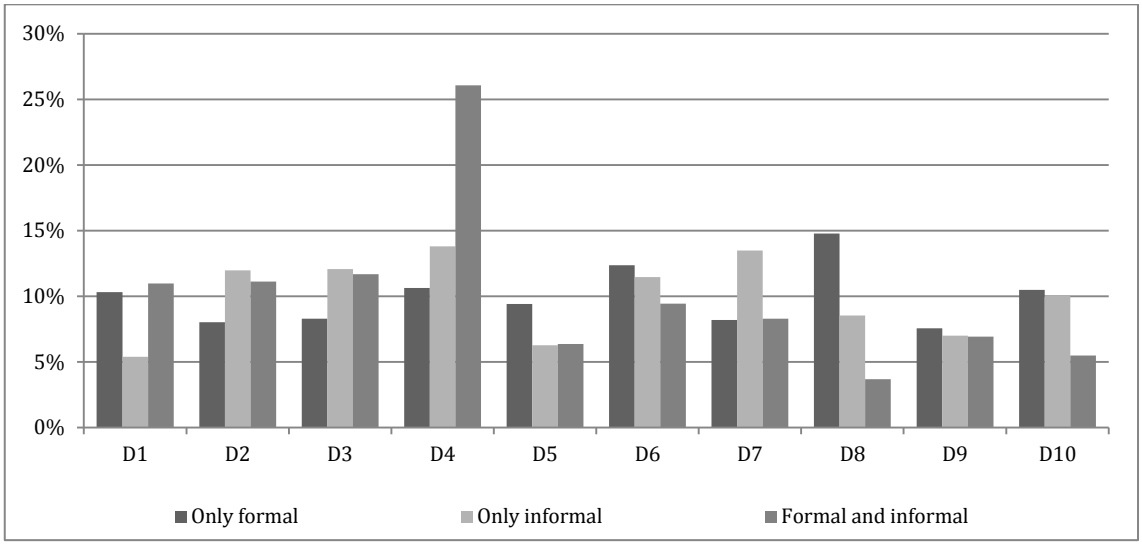


Source: Author's calculations based on SHARE wave 2

When we assess the use of formal and informal social care services along the income distribution (Figure 10.4), we see that the tendency to use only formal care increases very little when moving up in the income distribution. The tendency to use only informal care is relatively stable. For example, 33% of the elderly that rely only on formal care services have an income in the upper three income deciles (D8, D9 and D10) compared to only 26% of the elderly that rely only on informal care. The difference between both is not statistically significant.

[123] The differences between the income deciles are not statistically significant at an alpha-level of 0.05 (Pearson Chi^2=12.6261; DF=9; p=0.1840).

Figure 10.4. Use of social care services by the personal income decile distribution (weighted, 2007)[124]



Source: Author's calculations based on SHARE wave 2

3.1.2 The care package composition versus the income package composition

In this section, we investigate whether a relationship exists between the composition of the care package and the composition of the income package. We hypothesize that more diverse income packages go together with more diverse care packages. Note that this relationship can be intermediated by the generosity of the old age income package, which is also related to the income package composition (cf. chapter 8).

Table 10.7 shows the relative distribution of the research population by the composition of the care package and the personal income package. We do not find a straightforward relationship between the degree of diversification in the care package and in the personal income package. On the contrary, a higher degree of diversification in the care package seems to be associated with a higher proportion of the research population that relies only on a first pillar pension. For example, 28% of the elderly with a minor care use rely on only a first pillar pension compared to 40% of the elderly with a mixed care package. Elderly combining two or more pensions are somewhat overrepresented in the second-line health care package: 43% of the elderly with a second-line health care package

[124] The differences between the income deciles are statistically significant (Pearson Chi^2=39.8467; DF=18; p=0.0039). However, when respondents combining formal and informal long-term care services are excluded from the analysis, the differences between the income deciles are no longer statistically significant (Pearson Chi^2=12.6883; DF=9; p=0.1973).

combine a first pillar pension with a second or a third pillar pension in their personal income package (resp. 11% and 32%).

Table 10.7. Relative distribution of the research population by care package composition and personal income package composition (weighted, 2007)

	Personal income package (%)							
	P1	P2+P1	P1+P3	SS+ other	Wage+ other	Only P3	None	**Total (N=100%)**
Care package								
Minor care use	28	9	26	7	8	9	13	463
Second-line health care	26	11	32	6	6	10	9	361
Hospital treatment	24	10	30	10	6	4	15	197
Informal home help	37	10	32	11	2	3	5	212
Formal home help	46	5	28	6	3	5	7	130
Informal personal care	42	5	22	7	2	7	15	65
Mixed care package	40	8	23	10	3	4	12	131
Total	31	9	29	8	5	7	11	1558

Note: The relationship between the care package composition and the personal income package composition is statistically significant (Pearson Chi^2=92.6627; DF=36; p<0.0001).

Source: Author's calculations based on SHARE wave 2

In addition, Table 10.8 shows the relative distribution of the research population by the composition of the care package and the asset package. As could be expected from the results in chapter 8, little differences exist between the care package configurations along financial asset ownership. Only among the elderly with an informal personal care package the financial asset ownership is quite low: 'only' 89% has financial assets. More pronounced differences occur when home ownership and secondary residence are considered. Concerning home ownership, Table 10.10 shows that the proportion of elderly with home ownership decreases when the complexity of the care package increases. For example, 82% of the elderly with a minor care package owns a home for living, while this is the case for only 67% of the elderly with a mixed care package. Similarly, secondary residence ownership decreases when the complexity in the care package increases: 19% of the elderly with a minor care package owns a secondary residence, compared to only 11% of the elderly with a mixed care package.

Table 10.8. Relative distribution of the research population by asset ownership and care package composition (weighted, 2007)

	Asset ownership			
%	**Financial assets**	**Home**	**2nd residence**	**Total (N)**
Care package				
Minor care use	98	82	19	463
Second-line health care	98	85	22	361
Hospital treatment	97	84	20	197
Informal home help	96	74	15	212
Formal home help	98	79	15	130
Informal personal care	89	74	9	65
Mixed care package	96	67	11	131
Significance (*p*)	0.0023	<0.0001	0.0262	

Note: Only the proportion of the research population that owns a specific asset source is included in this table.

Source: Author's calculations based on SHARE wave 2

We can conclude that, despite our expectations, a higher degree of diversification in the income package is not significantly related to a higher degree of diversification in the care package. On the contrary, elderly with lower degrees of diversification in both their personal income package and their asset package tend to have more complex care packages. This could be the result from intermediating variables that are not measured here, like differences in the generosity of the income package or differences in the health status and functional level. Multivariate analyses, controlling for background differences, have to shed more light on the actual relationship between the composition of the care package and the old age income package (cf. section 4).

3.2 The intensity of care use along the lines of the old age income package

In this section we investigate whether the intensity of the care use is related to the generosity of the old age income package. We assume that more generous old age income packages generate more means to buy in care services, which results in a higher intensity of use of health and social care services.

Table 10.9 gives the mean and median monthly equivalent net income from the personal and the extended income package by the intensity of the use of health and social care services. The mean and median income shows to be lower for elderly with a higher intensity of use than for elderly with a low intensity of care services use. For example, the level of the personal income package is about 1100 Euros per month for elderly with a high intensity of health care services use, while it is about 1400 Euros per month for elderly with a low intensity of use. For the use of social care services, the overall trend is the same, but the differences are smaller. Elderly with a high intensity of social care services use on average receive 1100 Euros per month from the personal income package, while elderly with a low intensity of use on average have almost 1200 Euros from their personal income package.

Table 10.9. Mean and median monthly equivalent net income from the personal and the extended income package by the intensity of health and social care use (weighted, 2007)

		Personal income package		Extended income package	
Intensity of use	**N**	**Mean**	**Median**	**Mean**	**Median**
Health care services					
Low	807	1402	1082	1587	1212
Moderate	366	1231	1073	1378	1199
High	320	1122	1036	1246	1094
Correlation		*r*=-0.0534 *p*=0.0393		r=-0.0654 p=0.0116	
Social care services					
Low	198	1196	1084	1373	1237
Moderate	213	1123	1001	1258	1081
High	172	1118	991	1239	1042
Correlation		r=-0.0544 p=0.2130		r=-0.0532 p=0.2267	

Note: Only respondents actually using health and social care services are included in the calculation.

Source: Author's calculations based on SHARE wave 2

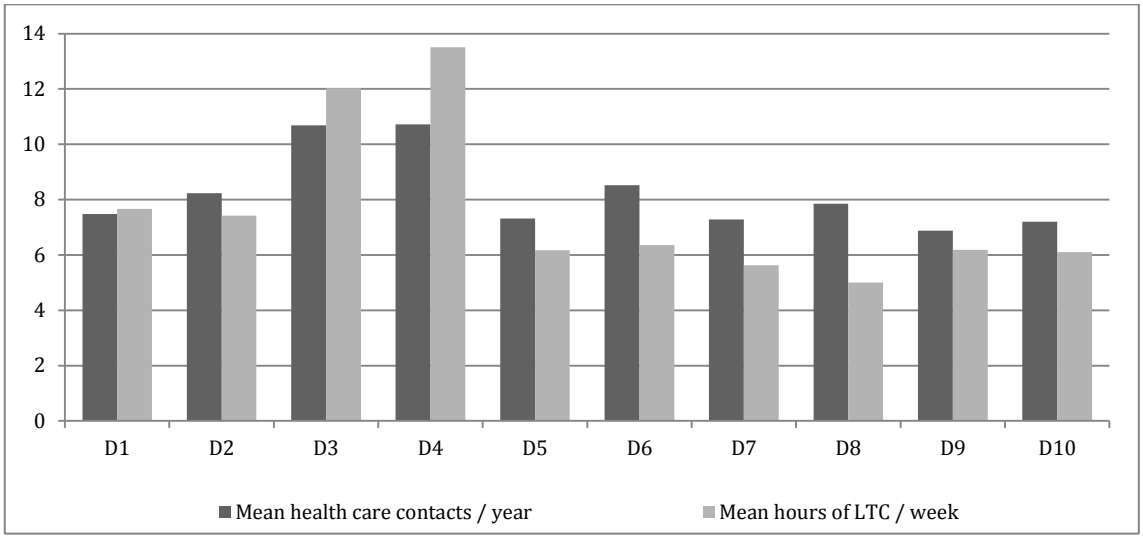
In addition, we calculated the correlation between the income from the personal and the extended income package and the intensity of use of health and social care services.[125] The Spearman correlation coefficient between the generosity of the income package and the intensity of the use of health care services was not statistically significant (p=0.2130). The correlation, that was very weak, indicated a negative relationship between the intensity of use and the generosity of the income package. No significant correlation was found between the generosity of the income package and the intensity of use of social care services.

When looking at the intensity of health and social services care use along the income distribution, presented in Figure 10.5[126], we see that overall the mean intensity of both health and social care services is higher in the lower income deciles than in the upper income deciles. The mean intensity of health and social care services is largest in the third and fourth income decile: elderly in these income groups on average had more than 10 contacts with a health care provider. Elderly using social care services in D3 and D4 on average received 12 to 13 hours of care per week. After D4 the mean intensity decreases. For example, in the highest income decile elderly on average had 7 health care contacts during the last year and elderly on average received 6 hours of care per week.

[125] We computed the Spearman correlation coefficient using the PROC CORR procedure in SAS.

[126] Because little differences between the personal and the extended income package distribution were found, we only include the personal income distribution here.

Figure 10.5. Mean intensity of health and social care services use by the personal income decile distribution (weighted, 2007)



Source: Author's calculations based on SHARE wave 2

Lastly, we also assess the relationship between the generosity of the income package and whether the older care receiver relies primarily on formal or on informal care. Table 10.12 shows the mean and the median monthly equivalent income from the personal and the extended old age income package by whether the respondent relies on:

- only formal care;
- only informal care;
- formal and informal care, but mainly on formal care;
- formal and informal care, but mainly on informal care.

Table 10.10. Mean and median monthly equivalent net income from the personal and the extended income package by relying primarily on formal or informal care services (weighted, 2007)

		Personal income package		Extended income package	
	N	**Mean**	**Median**	**Mean**	**Median**
Care provider					
Only formal care	120	1195	1077	1350	1192
Primarily formal care	81	1061	1000	1222	1113
Primarily informal care	95	1026	955	1146	977
Only informal care	284	1192	1070	1339	1145
Significance (*p*)		0.5787		0.2094	

Note: Only respondents using social care services are included in the calculation of the means and the medians.

Source: Author's calculations based on SHARE wave 2

The income differences between the respondents relying on social care services are very small. The mean and median personal income of elderly relying only on formal care or

relying only on informal care are almost the same, about 1190 Euros per month. Among elderly combining formal and informal care services, the income from the income package is a little higher for elderly that rely primarily on formal care services than for elderly that rely primarily on informal care services (resp. 1061 Euros vs. 1026 Euros per month for the personal income package).

We can conclude that whereas we expected that higher incomes would go together with a higher intensity of use of health and (formal) social care services, this is not univocally supported by the data. Elderly with high intensities of use of health and social care services overall have less generous income packages than elderly with low intensities of use. However, when we look at the income distribution, the mean intensity of use tends to peak in the lower half of the income distribution and decreases in the second half of the income distribution. We assume that unmeasured variables intervene in the relationship between the generosity of the income package and the intensity of health and social care services use. For example, age is related to the generosity of the old age income package and the use of health and social care services. Older respondents showed to have less generous income packages (cf. chapter 8), and are expected to have a more diverse and more intense use of care services. This is investigated further in the multivariate models in the next sections.

4. Explaining the care package composition

In this section, we investigate which determinants are statistically significant in explaining the composition of the care package, the use of health care services and the use of social care services. Three logistic regression models are estimated. Our main focus is on the effect of the old age income package (generosity and composition), but also other sociodemographic, socioeconomic and health status variables are included in the models.

Given the categorical character of the three dependent variables, we calculate three logistic regression models. In section 4.1. we discuss the construction of the models; the model results are discussed in the subsequent sections.

4.1 Construction of the logit models

The dependent variable in the first logistic regression model is the care package composition, a categorical variable with seven categories: minor care use, second-line health care, hospital care, informal home help, formal home help, informal personal care and a mixture of these health and social care services (cf. supra). The reference category is the minor care package. The second model investigates whether the respondent has had contact with at least one second-line health care provider (specialist) during the last year (binomial categorical variable). The reference category is that the respondent did not have any contact with a second-line health care provider. In the third model, the use of social

care services is the dependent variable. This is a categorical variable with three categories: use of formal care, use of informal care, or a combination of both.

Diverse independent variables are included in the three models (see Table 10.11). The focus is on the old age income package (generosity and composition). A difference is made between the models including the personal income package (A-models) and the models including the extended income package (B-models). To simplify the interpretation of the results, we include the generosity of the income package as a categorical variable with five categories corresponding to the income quintiles. Five health related independent variables are included: subjective health status, multimorbidity, multi health symptoms, multi ADL limitations and multi IADL limitations.[127,128] Further, six sociodemographic and socioeconomic background variables are included: sex, age, occupational status, level of education, living situation, and region of residence.

Table 10.11. Independent variables in the logit models testing the care package composition and their reference category

		Dependent variable					
		Model 1: Care package		Model 2: Second-line health care		Model 3: Social care services	
Independent variable	**Reference category**	**LM A**	**LM B**	**LM A**	**LM B**	**LM A**	**LM B**
Income package							
Personal income package	Only P1	X	X	X	X	X	X
Financial assets	Ownership	-	X	-	X	-	X
Home ownership°	Ownership	-	X	-	X	-	X
Secondary residence	Ownership	-	X	-	X	-	X
Income level	Q1	X	X	X	X	X	X
Health and functional level							
Subjective health status	Poor	X	X	X	X	X	X
Multimorbidity	≥2 health problems	X	X	X	X	X	X
Multisymptoms	≥2 health symptoms	X	X	X	X	X	X
Multi ADL limitations	≥2 ADL limitations	X	X	-	-	X	X
Multi IADL limitations	≥2 IADL limitations	X	X	-	-	X	X
Sociodemographic and socioeconomic background							
Sex	Female	X	X	X	X	X	X
Age	75+	X	X	X	X	X	X
Occupational status	No occupation	X	X	X	X	X	X
Level of education	Low	X	X	X	X	X	X
Living situation	Single	X	X	X	X	X	X
Region of residence	Brussels	X	X	X	X	X	X

Note: X = variable is included in the model - = variable is not included in the model

Note: In the B-models, home ownership is also included as an independent variable, although it does not generate an immediately available income like the interests from financial assets or the rental incomes from secondary residence. However, because home ownership can induce differences in the consumption behaviour of care services, we have included it here as an independent variable (cf. chapter 4).

[127] For the operationalisation of the controlling variables, see Appendix 7.

[128] In the model testing the use of second-line health care, the functional status variables are not included. In the model testing the use of long-term care services, health status variables are not included.

In all models, observations with missings on one of the variables in the model were deleted.[129] In addition, the population was limited to respondents that received the investigated type of care. In the models testing the contact with a second-line health care provider, the population in the model was limited to the respondents that had at least one contact with a health care provider (first- and second-line).[130] The models with the use of social care services as the dependent variable, included only respondents that actually received social care services during the last year.[131] Before estimating the models, the model assumptions were examined. No violations were found on the multicollinearity and linearity assumptions. To avoid problems with small n's and empty cells, we did not include interaction effects in the models. A number of outliers were detected, however, we decided not to remove these observations from the models. Given the sample size, we expect that the (potential) distorting effect of these outliers is rather low. In SAS, we used PROC LOGISTIC to compute the logit models; the GLOGIT function (generalized logit) was used in the multinomial models.

The logistic regression analyses were executed in two stages. In the first stage, we include only income package variables. In the second stage, we add the health and functional level variables, as well as the sociodemographic and socioeconomic background variables. In this way we can assess if the effect of the income package changes or disappears when other variables are taken into account. An overview of the global model statistics of the complete models (i.e. p-values, Nagelkerke R^2) is shown in Table 10.12. The most remarkable observation is that the neither the personal old age income package nor the extended income package is statistically significant in any of the estimated models.

[129] In Appendix 8 an analysis of the deleted observations on a number of background characteristics is provided.
[130] 68 respondents that did not have contact with a health care provider are excluded from the model.
[131] 945 respondents that did not receive long-term care during the last year are excluded from the model.

Table 10.12. Overview of the global model statistics of the logistic regression models on the use of care services (weighted, 2007)

	Model 1: Care package		Model 2: Second-line health care		Model 3: Social care services	
	LM 1A	**LM 1B**	**LM 2A**	**LM 2B**	**LM 3A**	**LM 3B**
N	1492	1492	1424	1424	547	547
Global model significance	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Income package						
Personal income package	0.4455	0.4239	0.5188	0.5690	0.4920	0.3412
Financial assets	-	0.0419	-	0.3269	-	0.6904
Home ownership	-	0.4393	-	0.4114	-	0.4059
Secondary residence	-	0.8850	-	0.8779	-	0.1844
Income level	0.3707	0.2612	0.3755	0.1270	0.1905	0.3707
Health and functional level						
Subjective health status	0.0001	0.0003	0.1081	0.0863	0.2889	0.1819
Multimorbidity	<0.0001	<0.0001	0.0001	0.0001	0.3178	0.3416
Multisymptoms	<0.0001	<0.0001	<.0001	<.0001	0.9721	0.9181
Multi ADL limitations	<0.0001	<0.0001	-	-	0.0003	0.0004
Multi IADL limitations	<0.0001	<0.0001	-	-	0.0141	0.0116
Background variables						
Sex	0.0279	0.0211	0.6107	0.6508	0.2022	0.2593
Age	<0.0001	<0.0001	0.0456	0.0506	0.0087	0.0089
Occupational status	0.0738	0.0712	0.1545	0.1707	0.0901	0.1077
Level of education	0.3989	0.4840	0.7207	0.8521	0.5446	0.5477
Living situation	<0.0001	<0.0001	0.5218	0.5416	0.2061	0.0798
Region of residence	0.2001	0.1167	0.0131	0.0187	0.1366	0.1472
Nagelkerke R^2	0.4187	0.4284	0.1119	0.1163	0.2693	0.2747

Note: - = variable is not included in the model

Because the models generate a quite extensive output, we have included the output in Appendix 10. The tables in the appendix include the odds ratios (OR) and the p-values. We distinguish between the model that includes only the income variables and the model that includes the income variables as well as the controlling variables.

4.2 A multinomial logit model explaining the care package composition[132]

In the first logit model (LM1A), that includes the personal old age income package as the main independent variable and the care package composition as the dependent variable, we see that before controlling for background differences the odds of receiving informal home help and the odds of receiving formal home help are lower for elderly with a wage

[132] See Table A10.1, Table A10.2, Table A10.3 and Table A10.4 in Appendix 10 for odds ratios and p-values.

or elderly without meaningful personal income sources (i.e. only P3 or none) than for elderly with a first pillar pension (OR < 1). Further, the odds on having a mixed care package are lower for elderly with a wage and for elderly with only a third pillar pension (OR < 1). Lastly, we also find that the odds on receiving second-line health care are significantly higher for elderly in the upper income quintile than for elderly in the bottom income quintile (OR > 1).

When we add the controlling variables to the model, all but one significant effect of the income package on the care package composition disappear. Only the odds of receiving informal home help are significantly smaller for elderly without personal income sources than for elderly with a first pillar pension (OR < 1). Apart from that, no significant relations between the care package composition and the personal income package are found when we control for differences in the health status, functional level and the sociodemographic and socioeconomic background of the respondents.

In the second logit model (LM1B), that includes the extended old age income package as the main independent variable of interest, among the income variables, the following significant relationships are found. The odds on receiving informal home help are lower for elderly with a wage than for elderly with a first pillar pension (OR < 1), and the odds on receiving informal personal care are larger for elderly without financial assets than for elderly with financial assets (OR > 1). Further, the odds on having a second-line health care package are lower for high-income elderly than for low-income elderly (OR > 1). In addition, also the odds on receiving formal home help are higher for elderly in the highest income quintile than for elderly in the lowest income quintile (OR > 1).

Although the old age income package does not have a significant effect on the care package composition when controlling for the health status, functional level, and a number of background variables, some conclusions can be drawn. We can say that the relationship between the care package composition and the old age income package is not as straightforward as initially expected. A higher income is not unison linked to having a more diverse care package, and the same holds for the relationship between having a more diverse income package and having a more diverse care package. Yet, we find some indications of such a relationship. For example, high-income elderly have higher odds on combining first- and second-line health care (versus having a minor care package) than low-income elderly. Also, the odds on receiving formal home help are larger for high-income elderly than for low-income elderly. This hints into the direction of a more generous income package - more diverse care package relationship.

The - overall - ruling out of the effect of income when controlling for health status, functional level and sociodemographic background differences, possibly is the result of the quasi-universal Belgian national health insurance. As discussed in chapter 4, the Belgian health insurance offers reimbursements for the use of a wide range of health and social care services. Low-income elderly (cf. chapter 4) can apply for partial or complete reimbursements for the use of health and social care services covered by the Belgian national health insurance. In addition, financial contributions for a specified number of health and social care services are provided by one's health insurance fund. This could

explain why no major significant differences in the income package composition are found between high- and low-income elderly. The absence of a significant effect of asset ownership on the care package composition indicates that asset ownership does not induce an increased care consumption behaviour, as opposed to what was expected from the literature.[133]

4.3 A binomial logit model explaining the use of health care services[134]

The second group of models includes contact with a second-line health care provider as the dependent variable. In the first model (LM2A) no significant relationship exists between the personal income package and the use of second-line health care services. In contrast with our expectations, we do not find proof that having a higher income from personal income sources is significantly related to higher odds on contact with specialists. Health status and age are significant: the odds on contact with a second-line health care provider are significantly lower for elderly with less than two health related problems or symptoms (OR < 1). Further, the odds of contact with a second-line health care provider are significantly larger for elderly between 60 and 74 years than for elderly older than 75 years.

When we look at the second model (LM2B), that includes the extended income package as the main independent variable of interest, we do find some signs of a significant relationship between the use of second-line health care services and the old age income package. In the model that does not include the background variables, the odds of having contact with a second-line health care provider are significantly larger for high-income elderly (income quintiles Q4 and Q5) than for low-income elderly (OR > 1). Remarkably, the model also indicates that elderly without home ownership have higher odds on contact with a second-line health care provider than elderly with home ownership (OR > 1). This is striking, because we would expect to find an opposite relationship in which home ownership is positively associated with second-line health care use because home ownership can induce an altered - increased - care consumption pattern (cf. supra). The significant relationship between home ownership and second-line health care, however, disappears when health status and sociodemographic background variables are added to the model. In the complete model only the generosity of the extended income package remains significantly related to the use of second-line health care (OR > 1). This confirms that having a higher income increases the odds on contact with a specialist, even when we

[133] According to Henretta and Campbell (1978), asset ownership is associated with altered consumption patterns, because assets provide a buffer for higher consumption levels. In addition, homeownership, on his turn, was expected to contribute importantly to the available income, since no rents nor mortgages have to be paid for housing.
[134] See Table A10.5 and Table A10.6 in Appendix 10 for odds ratios and p-values.

control for differences in the health status and the sociodemographic and socioeconomic background of the research population.

The confirmation of our hypothesis indicates that, despite the reimbursements for the use of second-line health care services via the national health insurance, and the larger reimbursements for low-income elderly, the effect of income is not ruled out completely. Possibly this results from the fact that a larger group of specialist doctors has not subscribed to the general tariff agreements (cf. chapter 4), and thus are free to charge higher fees. This results in a larger non-refundable part and larger personal payments for the care receivers.[135] Low-income elderly will experience more difficulties in paying these larger personal contributions than high-income elderly, and thus are confronted with a higher burden to contact second-line health care providers.

4.4 A multinomial logit model explaining the use of social care services[136]

A last group of models includes the use of social care services as the main dependent variable. In the complete models, neither the personal income package, nor the extended income package has a significant effect on whether the older person relies on formal care, informal care or on a combination of both. Only having functional limitations (i.e. two or more limitations in ADL and/or in IADL) and age are statistically significant in both models.

Interestingly, although not statistically significant, we find that the odds of relying on informal care decrease when the generosity of the income package increases. This indicates that the probability that high-income elderly use informal care is lower than the probability that low-income elderly will do so, even when we control for differences in health status, functional level and other background variables (OR < 1). Similarly, the odds of combining informal and formal care services are lower for high-income elderly than for low-income elderly (OR < 1).

5. Explaining the intensity of care use

In this section, we investigate whether differences in the intensity of the use of health and social care services are explained by differences in the income package. We expect that

[135] Based on figures from the NIHDI, a study directed in 2006 by the Belgian Health Care Knowledge Center on co-payments in the Belgian health care indicates that on average 20% of the specialists (with peaks to more than 30% in some Belgian regions) has refused to subscribe the general tariff agreements, compared to 15% of the general practitioners (De Graeve, Lecluyse, Schokkaert, Van Ourti, & Van de Voorde, 2006).

[136] See Table A10.7 and Table A10.8 in Appendix 10 for odds ratios and p-values.

more generous income packages generate more means to buy in health and social care services, resulting in a higher intensity of use. We construct two separate models: one model with the intensity of health care services use as the dependent variable, and one model with the intensity of social care services use as the dependent variable. In section 5.1 we discuss the construction of both models; in sections 5.2 and 5.3 we go into the details of the model results.

5.1 Construction of the models

In the first model, the dependent variable refers to the intensity of the use of health care services, which is operationalized as the number of contacts the elderly person had with a health care provider during the last year. To make the interpretation of the results easier, we use the categorical variable with three categories: a low intensity of use (1 to 6 contacts), a moderate intensity of use (7 to 12 contacts) and a high intensity of use (more than 12 contacts). The reference category is a low intensity of use. In the second model the intensity of the use of social care services (hours of social care services received) is the categorical dependent variable. We distinguish a low intensity of care use (less than one hour of care per week), a moderate intensity of use (one to seven hours of care per week), and a high intensity of care use (more than seven hours of care per week). The reference category is having a low intensity of care services use.

The independent variables in the models on the intensity of health care use resemble the variables in the models testing the use of health care services. Functional level variables are not included in these models, because we do not expect functional status to be directly related to the use of health care services. For the models testing the intensity of formal social care services use, the independent variables are the same as those included in the models on the use of social care services (cf. supra).

We enter the variables into the models in two stages: in a first stage we include only income variables, and in a second stage we add the controlling variables (health and functional status; sociodemographic and socioeconomic background variables). In this way we are able to see if the income package has a statistically significant effect on the intensity of use, and if this effect changes when account is given to the background differences between the respondents.

Observations are deleted when they have missings on one of the variables in the model.[137] Further, we limited the analysis to respondents that had at least one contact with a health care provider[138], resp. social care provider[139] during the last year; respondents without

[137] An analysis of the deleted observations is included in Appendix 8.
[138] 68 respondents that did not have any contact with a health care provider have been excluded from the model.

this type of contacts were removed from the models. An examination of the logistic regression assumptions did not show any violations on the multicollinearity and linearity assumptions. A number of outliers were detected, however, we decided not to remove these observations from the models (cf. supra). In SAS, we used PROC LOGISTIC with the GLOGIT function (generalized logit) to calculate the logit models.

The global model statistics of the complete models (including all variables of interest) are presented in Table 10.13 (p-values). The old age income package is not statistically significant in any of the models. The explanatory power of the different models is quite high: all models explain at least 30% of the variance in the dependent variable (based on the Nagelkerke R^2).

Table 10.13. Overview of the global model statistics (p-values) of the logistic regression models on the intensity of the use of care services (weighted, 2007)

	Model 4: Health care services		Model 5: Social care services	
	LM 4A	**LM 4B**	**LM 5A**	**LM 5B**
N	1145	1145	270	270
Global model significance	<0.0001	<0.0001	<0.0001	<0.0001
Income package				
Personal income package	0.2358	0.3204	0.3657	0.3589
Financial assets	-	0.4000	-	0.4705
Home ownership	-	0.5358	-	0.6336
Secondary residence	-	0.5626	-	0.5422
Income level	0.2466	0.7640	0.5671	0.2887
Health and functional level				
Subjective health status	<0.0001	<0.0001	0.1584	0.5602
Multimorbidity	<0.0001	<0.0001	0.5709	0.8112
Multisymptoms	<0.0001	<0.0001	0.7798	0.0483
Multi ADL limitations	-	-	0.0356	0.0004
Multi IADL limitations	-	-	0.0004	0.5602
Background variables				
Sex	0.0608	0.0607	0.6746	0.6266
Age	0.0001	0.0002	0.0014	0.0011
Occupational status	0.2052	0.1521	0.1267	0.1731
Level of education	0.0117	0.0138	0.1952	0.1646
Living situation	0.1556	0.1366	0.0097	0.0140
Region of residence	0.0308	0.0391	0.0078	0.0075
Nagelkerke R^2	0.3110	0.3099	0.4697	0.4890

The detailed model results are included in appendix 10 (odds ratios and p-values). The results are discussed in the following sections. Section 5.2 focuses on the intensity of the

[139] 1220 respondents that did not receive formal long-term care have been excluded from the models.

use of health care services, while section 5.3 focuses on the intensity of the use of social care services.

5.2 A multinomial logit model explaining the intensity of health care services use[140]

First, we consider the detailed model results of the model with the personal income package as the main independent variable (LM4A). When we control for differences in the respondent's health status and sociodemographic and socioeconomic background, we see that elderly with a higher income have higher odds on having a moderate use of health care services (vs. a low intensity of use) than elderly with a low income (OR > 1). Further, the odds of having a high intensity of health care services use are significantly lower for elderly that combine first and third pillar pension, and elderly that receive a wage than for elderly that have only a first pillar pension (OR < 1). Yet, the explanatory power of the income variables is very limited. Mainly the respondent's health status and his/her age are decisive in explaining the intensity of the use of health care services. The odds of having a moderate or a high intensity of health care services use are lower for elderly with a quite good health status than for elderly with a quite bad health status (i.e. for elderly with two or more health related problems or health related symptoms). Also elderly between 60 and 74 years have significantly lower odds on having a moderate to high intensity of use than elderly that are 75 years and over (OR < 1).

Secondly, we focus on the model including the extended income package as the main independent variable to investigate whether asset ownership induces a different (health care) consumption behaviour. Yet, in the complete model we do not find any evidence of this. None of the income variables are statistically significant. However, the direction of the relationship to some extent confirms our expectations. The odds of having a moderate intensity of health care services use (vs. a low intensity) are larger for elderly in the higher income quintiles than for elderly in the lower income quintiles (OR > 1). Again, health status variables and age are central in explaining differences in the intensity of the use of health care services.

By and large, based on the logit models presented here we can conclude that in contrast with our expectations no statistically significant relationship is found between the intensity of health care services use and the old age income package. Again, we expect this to be one of the merits of the Belgian national health insurance scheme, which seems to eliminate successfully the income related inequalities in the use of health care services and in the intensity of the use of these services.

[140] See Table A10.9 and Table A10.10 in Appendix 10 for odds ratios and p-values.

5.3 A multinomial logit model explaining the intensity of social care services use[141]

When the effect of the personal old age income package is considered (LM5A), we do not find an overall statistically significant effect of the income variables on the intensity of the use of social care services. Neither the generosity, nor the composition of the income package is significant in explaining the intensity of the use of social care services by an older person. However, although not statistically significant, we see that the odds of having a moderate or a high intensity of use (versus a low intensity of use) tend to be higher among the higher income groups than among the lower income groups: the odds ratios are larger than one for income quintiles Q2, Q3 and Q4 (in comparison with Q1).

A similar trend is found when the extended income package is considered. Again, neither the composition, nor the level of the available income from the income package have a statistically significant relationship with the intensity of the use of formal social care services. Nevertheless, we see that the odds of having a more intense use of formal care services tend to be higher for elderly in the upper income quintiles than for elderly in the bottom income quintile. For example, the odds of having a high intensity of formal care services use are about ten times higher for elderly in the upper income quintile than for elderly in the bottom income quintile (OR=10.80).

In addition, in both models the intensity of use of social care services is significantly lower for elderly without limitations in their functional status (OR < 1). Further, the odds of having a moderate or high intensity of care services use (versus a low intensity of use) are smaller for men than for women (OR < 1), which indicates that women overall tend to be more intensive users of social care services. Similarly, the odds of having a higher intensity of care services use are significantly smaller for elderly living with a partner than for singles (OR < 1), which indicates that single-living elderly are more intensive social care users.

To conclude we can say that the old age income package does not have a significant effect on the intensity of the use of social care services when we control for differences in the health status, functional level, and sociodemographic and socioeconomic background of the research population. This resembles the results of the multinomial logit model on the intensity of health care services use. Again this could be an indication of the success of the quasi universal national health insurance scheme, which provides reimbursements for the use of certain social care services, and more generous repayments for low-income groups, thus intervening in the expected relationship between the old age income package and the intensity of the use of social care services. An alternative explanation could be that the importance of ('cheap') informal care rules out income related differences in the intensity

[141] See Table A10.11 and Table A10.12 in Appendix 10 for odds ratios and p-values.

of the use of care services. However, also when we limit the logit models to the intensity of the use of formal care services, no significant effect of the old age income package is found.

6. Assessing the quality of the old age care package

In this section, we evaluate the quality of the health and social care services of the Belgian elderly population. In doing so, the analyse are limited to the respondents that received the investigated type of care. Our investigation includes an objective assessment of the receipt of appropriate care for specific needs, and a subjective assessment of the care receiver's satisfaction with the care received. This is done both for health and social care services. We use six indicators to measure the quality of the old age care package (cf. section 2.3):

- the ratio of success of specialist contacts;
- the ratio of success of the receipt of adequate medication[142];
- the receipt of personal care by elderly with ADL limitations;
- the receipt of home help by elderly with IADL limitations;
- the satisfaction of the care receiver with the care received; and
- whether the social care received corresponds to the care receiver's opinion on who should provide care.

Our investigation is restricted by several - overall data related - limitations (cf. supra).[143] This leads to an important amount of missing values in the constructed quality indicators. Consequently, the statistics presented here wish to explore the quality of the health and social care services used rather than to really evaluate the quality of these services. In addition, because of the important amounts of missing values, the reliability of the test statistics is expected to be low. This should be kept in mind when interpreting the research results.

In the analyses, there is a strong focus on the link between the receipt of appropriate care and the income package to investigate whether income differences are translated into care differences in that more generous income packages generate more appropriate care packages. We separately analyse the appropriateness of the health care services received (section 6.1) and of the social care services received (section 6.2).

[142] Please note that medication is used here as an indicator of the quality of health care, although medication as such is not included in the care package concept. However, because medication often is prescribed by a health care provider, the use of medication is closely related to contact with a general practitioner or a specialist.

[143] To recall, very limited information on the quality of care is included in the SHARE (see chapter 9).

6.1 The quality of the health care package

We first focus on the quality of the health care package. This is limited to the receipt of appropriate health care and medication for specific health problems. In the previous chapter, the receipt of appropriate health care was operationalised as the ratio of success of matching specific health problems to contacts with an appropriate specialist. The actual successful matches are compared with the potentially successful matches to get the success ratio. Similarly, the ratio of success of the receipt of appropriate medication for specific health problems is calculated.

Table 10.14 shows the distribution of the research population by the ratio of successful specialist contacts and successful medication.[144] Overall, the success ratio of having received appropriate medication is higher than that of appropriate specialist contacts. The average ratio of success for medication is about 0.72, while for specialist contacts it is only 0.52. Almost 30% of the research population with a specific health problem never had contact with an appropriate specialist during the last year, while only 14% did never receive appropriate medication. More than half of the research population always received appropriate medication, while only 33% of the respondents with a specific health problem always had contact with an appropriate specialist.

Table 10.14. Distribution of the research population by the ratio of successful health care contacts and medication (weighted, 2007)

		Specialist contacts		Medication	
		N	%	N	%
Success ratio	**Ratio**				
Never	0	235	30	183	14
Sometimes	0.1-0.5	85	11	46	4
Most of the time	0.5-0.9	209	27	360	28
Always	1	257	33	692	54
Mean		0.51		0.72	
Total (N)		**785**		**1280**	

Source: Author's calculations based on SHARE wave 2

Additionally, we investigated the relationship between the health care quality indicators and the generosity of the income package. Table 10.15 shows the success ratio of specialist contacts and medication along the personal income quintile distribution. Although we expected that elderly in the higher income quintiles would have higher success ratios, this

[144] More details on the relationship between the quality of the health care package and some background characteristics of the research population are provided in the annex. The success ratio of specialist contacts is lower for women than for men, which confirms their more vulnerable position.

is not confirmed in the data. For example, about 35% of the elderly in the upper income quintile with a specific health problem never had contact with an appropriate specialist, compared to 29% of the elderly in the bottom income quintile. Little differences are found between the income quintiles on the success ratio of the medication use. In all income quintiles, more than 70% of the research population received appropriate medication for a specific health condition.

Table 10.15. Relative distribution of the research population by the individual income quintile distribution and the ratio of successful health care contacts and medication (weighted, 2007)[145]

%	Q1	Q2	Q3	Q4	Q5
Specialist contacts					
Never	29	32	28	26	35
Sometimes	8	14	13	14	6
Most of the time	31	27	24	25	24
Always	32	27	35	36	35
Total (N=100%)	**137**	**180**	**134**	**154**	**161**
Mean ratio	0.52	0.47	0.53	0.54	0.50
Correlation	r=-0.0063		*p*=0.0806		
Medication					
Never	12	15	16	14	14
Sometimes	3	4	4	4	2
Most of the time	27	29	33	29	25
Always	58	52	47	53	59
Total (N=100%)	250	299	216	252	230
Mean ratio	0.75	0.70	0.68	0.72	0.74
Correlation	r=0.0186		*p*=0.5116		

Source: Author's calculations based on SHARE wave 2

In addition, we calculated the linear correlation between the generosity of the personal income package and the success ratio of specialist contacts and medication.[146] Neither for the success ratio of specialist contacts, nor for the success ratio of medication a significant correlation with the generosity of the personal income package was found.

Based on the statistics presented here, we can conclude that the majority of the elderly population with specific health problems received health care services adapted to their health conditions, either via contacts with appropriate specialists or via the receipt of appropriate medication. In contrast with our expectations, no straightforward relationship

[145] The relative distribution based on the extended available income package resembles this distribution based on the individual old age income package. Therefore, we only include the individual income quintile distribution.

[146] We computed the Spearman correlation coefficient using the PROC CORR procedure in SAS.

between the generosity of the old age income package and the quality of the health care services is found. Elderly with a more generous income package do not have a higher ratio of success, neither for the contacts with specialists, nor for the receipt of appropriate medication. This could be attributed to the 'mediating potential' of the Belgian national health insurance scheme. As mentioned before, reimbursements for the use of a wide range of health care services (including medication) are provided via the Belgian national health insurance scheme. In that scheme low-income households are eligible for more favourable reimbursement rates than high-income households. It seems that this intervention rules out the expected income-related differences in the receipt of appropriate health care between low- and high-income elderly. Obviously, one must take into the suboptimal character of the health care quality indicators because of the lack of relevant information in the SHARE.

6.2 The quality of the social care package

In this section, we address the quality of the social care services received by the elderly population. We focus on three quality aspects, namely whether an older person with limitations in ADL and/or IADL receives appropriate care (resp. personal care and/or home help); whether the care receiver considers the care as meeting his or her needs; and whether the received care matches with the care receiver's expectations on who should provide care (the family versus the state). Again, we investigate the relationship between the generosity of the old age income package and the receipt of appropriate care. We expect that more generous income packages generate more appropriate care packages.[147]

Table 10.16 shows the distribution of the research population by the receipt of care adapted to their ADL and IADL limitations, and whether the care provider meets the care receivers' preferences on who should provide this type of care. In addition, Table 10.17 includes information on whether the care provided meets the needs of the care receiver. Note that only respondents with limitations in their ADL and/or IADL, and respondents actually using social care services are included in these statistics.

[147] More details on the relationship between the quality of the long-term care package and some background characteristics of the research population are provided in appendix 9.

Table 10.16. Distribution of the research population by the receipt of appropriate social care and the preferential care provider (weighted, 2007)

	Success		No success		Total
	N	%	N	%	(N=100%)
Receipt of appropriate care					
Personal care	103	37	175	63	278
Home help	243	65	130	35	373
Preferential care provider					
Personal care	91	66	46	34	137
Home help	248	65	134	35	382

Note: The receipt of appropriate care includes only respondents with limitations in their ADL and/or IADL. The patient satisfaction with the care provider ('preferential care provider') is limited to elderly that received personal care and/or home help.

Source: Author's calculations based on SHARE wave 2

Table 10.17. Distribution of the research population by the patient satisfaction with the social care services received (weighted, 2007)

Patient satisfaction with care	N	%
Never	4	1
Sometimes	25	7
Most of the time	119	32
Always	225	60
Total	373	100

Note: The patient satisfaction with the care services received includes only respondents with limitations in their ADL and/or IADL.

Source: Author's calculations based on SHARE wave 2

More than 60% of the research population with limitations in their ADL did not receive personal care, while about 35% of the research population with limitations in their IADL did not receive home help ("receipt of appropriate care"). This indicates a higher burden to search for and to find appropriate care for elderly with ADL limitations. In addition, Table 10.16 shows that - overall - the care is provided by a care provider that meets the preferences of the care receiver ("preferential care provider"). Both for personal care and for home help, more than 60% of the older care receivers indicate that the care is provided by the caregiver of their preference. Also the satisfaction with the care received is quite high: more than 90% of the research population with limitations in their ADL and/or IADL that receives care states that the care received most of the time to always meets their care needs.

Furthermore, we investigated the relationship between the generosity of the old age income package and the appropriateness of the old age care package to assess whether income-related differences are reproduced in the quality of the care package. We expect that elderly in the upper income quintiles enjoy higher quality care than elderly in the lower income quintiles. However, this is not confirmed entirely in the data presented in Table 10.18. Elderly in the upper income quintiles do not receive more often social care services adapted to their care needs than elderly in the lower income quintiles ("patient satisfaction"). Similarly, elderly in the upper income quintiles are not more satisfied with

the care they received than elderly in the lower income quintiles. On the contrary, low-income elderly are stronger represented among the research population that states to be always satisfied (25% versus 19% high-income individuals). Only the indicator on the preferential care provider points somewhat in the expected direction. Among those that received personal care from their preferential care provider, elderly with an income in the upper income quintile are stronger represented than elderly with an income in the bottom income quintile (resp. 20% versus 14%).

Table 10.18. Relative distribution of the research population by the individual income quintile distribution and the social care quality indicators (weighted, 2007)[148]

%	Q1	Q2	Q3	Q4	Q5	Total (N=100%)
Receipt of appropriate personal care						
Success	19	27	19	16	19	98
No success	16	32	18	22	11	173
Receipt of appropriate home help						
Success	19	29	18	15	19	236
No success	21	31	17	19	12	128
Preferential personal care provider						
Success	14	32	19	14	20	90
No success	24	32	16	19	10	42
Preferential home help provider						
Success	18	27	11	23	20	231
No success	20	29	19	16	16	130
Patient satisfaction with care						
Never	0	27	0	46	27	4
Sometimes	24	17	29	16	15	25
Most of the time	16	39	17	18	10	116
Always	25	22	15	19	19	218

Note: The receipt of appropriate social care includes only respondents with limitations in their ADL and/or IADL. The patient satisfaction with the care provider ('preferential care provider') is limited to elderly that received personal care and/or home help. The patient satisfaction with the care received includes only respondents with limitations in their ADL and/or IADL.

Source: Author's calculations based on SHARE wave 2

It becomes clear that our expectations on the relationship between the generosity of the income package and the appropriateness of the old age care package are not confirmed. Elderly with more generous income packages do not receive more appropriate social care than elderly with less generous old age income packages. This can have several reasons. The restrictions in the old age care package quality indicators leave important dimensions of care quality unmeasured. In addition, the group of elderly relying on social care services is rather small and no complete information from the three indicators was available,

[148] The relative distribution based on the extended available income package resembles this distribution based on the individual old age income package. Therefore, we only include the individual income quintile distribution.

which could bias the research results. Furthermore, the relationship between the old age income package and the receipt of appropriate social care services possibly is distorted by intervening variables not included here. For example, when the receipt of appropriate care is related to sex or living situation, two factors also related to the generosity of the income package, these variables could intervene in the relationship between the old age income package and the quality of the old age care package. In addition, the role of the Belgian national health insurance scheme, that also includes a wide range of social care services, and the provision of social care services via the Public Social Service Departments may not be neglected. Different mechanisms, favouring low-income households, are developed to limit the reproduction of income inequalities in the use of social care services: increased reimbursement rates, an extended third party payer's scheme, reduced user fees for social care services provided by the Public Social Service Departments, etc.[149]

7. Conclusion

In this chapter, we focused on the protection of the older population against the functional dimensions of old age dependency. Several questions were posed. How does the care package of the Belgian elderly population look like, and what role does the old age income package play in the composition and level of protection enjoyed from this care package? More specifically, are differences in the income package reproduced in the care package, and do elderly with a more generous old age income package have a more diverse, a more intense and a higher quality health and social care package? Five hypotheses were formulated and tested:

H1. Elderly with a more generous and/or a more diverse income package are expected to have a more diverse care package than elderly with a less generous and/or a less diverse old age income package, when controlling for health status and functional level.

H2. Elderly with a more generous and/or a more diverse income package are expected to have more contact with specialists than elderly with a less generous and/or a less diverse old age income package, when controlling for health status and functional level.

H3. Elderly with a more generous and/or a more diverse income package are expected to rely more on formal care, while elderly with a less generous and/or a less diverse old age income package are expected to draw more on informal care, when controlling for health status and functional level.

H4. Elderly with a more generous income package are expected to have a higher intensity of health and social care services use than elderly with a less generous income packages, when controlling for health status and functional level.

[149] A more detailed overview of the different services is provided in chapter 4.

H5. Elderly with a more diverse care package are expected to enjoy higher levels of protection against the functional dimension of old age dependency than elderly with a less diverse care package, when controlling for health status and functional level.

H6. Elderly with a more generous income package are expected to enjoy higher levels of protection against the functional dimension of old age dependency than elderly with a less generous income package, when controlling for health status and functional level.

Concerning the care package

First, we investigated the composition of the care package. Different health and social care services, as well as the intensity of the use of these care services, were included in the analysis. A hierarchical cluster analysis, discussed in chapter 8, showed the existence of seven care packages (care clusters), ranging from a low to a high degree of care diversity.

A large part of the older research population in Belgium has a quite low degree of diversity in their care use. About half of the research population has a minor care package or a second-line health care package, and thus relies solely on medical care services. About a third of the research population combines health and social care services in different configurations. The most diverse care package, i.e. the mixed care package that includes first- and second-line health care services, formal and informal personal care and home help, is found among 9% of the elderly population.

In addition, we assessed the intensity of the use of these care services. We made a difference between the intensity of the use of health care services (i.e. the number of contacts with a health care provider during a one year period) and the use of social care services (i.e. the hours of formal and informal care received during the same one year period). Concerning the intensity of the use of health care services, we found that about half of the research population has a low intensity of use (less than 6 health care contacts per year), and about 20% has a high intensity of use (on average more than monthly health care contacts). Among the elderly that received social care services, 40% received one to seven hours of care per week in 2007. A third of the care users is considered as high-intensity-users, receiving at least one hour of care per day (on average). Furthermore, the intensity of the use of health and social care services showed to be related to the composition of the care package. Elderly with a more diverse care package have a higher intensity of care services utilisation than elderly with a less diverse care package.

Lastly, we also explored the presence of vulnerable groups in the use of health and social care services, based on the sociodemographic and socioeconomic background of the research population. We found that women tend to be overrepresented among the elderly with more diverse care package than men. Similarly, the research population aged 75 years and over have more diverse care packages than elderly between 60 and 65 years. To some extent, status also was related to the use of second-line health care services. Elderly

with a high occupational status or a high level of education were overrepresented in the second-line health care package in comparison with elderly with a lower occupational status or a lower level of education. However, for the intensity of use, the opposite was found to be true. The average number of health care contacts and the hours of social care services received were higher among low-status elderly than among high-status elderly.

Concerning the relationship between the income package and the care package

Secondly, we focused on the relationship between the income package and the care package. This is the core of our dissertation. We investigated whether differences in the income package are related to differences in the composition of the care package and in the intensity of the use of health and social care services. We expected to find a kind of reproduction of inequalities: elderly with a generous and diverse old age income package were expected to have more diverse care packages and a higher intensity of care services utilisation than elderly with less generous old age income packages, when controlled for differences in their health and functional status. We did not limit our analyses to the personal old age income package (including personal income sources like pensions and social security benefits), but we included also the available income from assets (i.e. interests from financial assets and income from secondary residence). After all, asset income could provide the additional income needed to pay for certain care services. Account was also given to the potential influence of home ownership.

From the bivariate statistics we learned that elderly with a more diverse care package tend to have less generous and less diverse income packages. Elderly with a mixed care package have the lowest average income from the old age income package, while elderly with a second-line health care package have the highest average income from the old age income package. However, when we investigated the care package composition along the income distribution, we did not find a straightforward relationship between the income level and the care package composition. Elderly with a second-line health care package were somewhat over represented in the upper income deciles, while elderly with a mixed care package were somewhat over represented in the lower income quintiles. In addition, a higher degree of diversification in the care package was found to be associated with a lower degree of diversification in the personal income package. For example, while only a third of the elderly with a mixed care package combines a first pillar pension with a second and/or a third pillar pension, this holds for more than 40% of the elderly with a second-line health care package. Also property ownership proved to be lower among elderly with more diverse care packages than among elderly with less diverse care packages. In line with the bivariate statistics on the care package composition and the income package, we found that the generosity of the income package is lower for elderly with a high intensity of care services use than for elderly with a low intensity of care utilisation.

To control for differences in the health and functional status of the research population, and differences in the sociodemographic and socioeconomic background, we estimated different logit models with the care package composition and the intensity of the care services use as the dependent variables. Our focus was on the generosity and the composition of the income package to explain differences in the care package. In none of the estimated logit models, the income package composition and the generosity of the income package had a significant influence on the composition of the care package and on the intensity of the use of health and social care services. Overall, differences in the composition and the intensity of the care package were explained by differences in the health and functional status of the research population. None of our hypotheses on the relationship between the old age income package and the old age care package could be confirmed.

Concerning the quality of the care package

Thirdly, we explored the quality of the health and social care package of the elderly population. This is associated with our third research question on the extent to which the old age income package and the old age care package succeed in meeting the needs of the elderly population. In this chapter, the needs concept refers to the protection against the functional dimension of old age dependency. This was operationalised taking account of the health and functional status of the older population (e.g. health conditions, limitations in ADL and IADL, etc.). We matched the health and functional status of the elderly population to their health and social care use to assess to quality of the care package.

The appropriateness of the health care services proved to be quite high. More than half of the research population with a specific health condition most of the time had contact with an appropriate second-line health care provider. The success ratio of the receipt of appropriate medication was even higher: more than 80% of the research population stated that most of the time they received appropriate medication for a certain health problem. For social care services, we found that only 40% of the elderly with ADL limitations received personal care, and more than 60% of the elderly with IADL limitations received home help. The success ratio based on the preferential care provider and the patient satisfaction, however, was higher. For more than 60% of older population receiving care, this care is provided by the care provider of their preference. Moreover, more than 90% of the elderly with ADL or IADL limitations that receive social care services state that the care they receive most of the time meets their needs.

The quality of the care package was linked to the generosity of the old age income package to investigate whether income differences explain care quality differences. However, no statistically significant relationship was found between the generosity of the income package and the receipt of appropriate social care. We thus can conclude that the receipt of appropriate care does not depend on the generosity of the old age income package, and

that inequalities in the old age income package are not reproduced into differences in the receipt of appropriate health and social care services.

However, with regard to our exploration of the quality of the care package, one must take into account the limitations we experienced in the operationalisation of the care quality concept, and resulting from this the preliminary character of the analyses presented here.

Overall conclusion

The research results in this chapter show that no statistically significant relationship exists between the old age income package and the old age care package. No reproduction of income inequalities into the use of health and social care services takes place among the Belgian elderly population.

This indicates the 'mediating potential' of the encompassing Belgian national health insurance scheme, which provides protection for a wide range of health and social care services. In this health insurance scheme, different mechanisms are included that aim to limit the reproduction of income inequalities in the use of health and social care services. Low-income households can apply for more favourable reimbursements rates, an extension of the third party payer's scheme for certain health care services, cheaper services, etc. This facilitates the access of low-income households to certain health and social care services and mediates the influence of income. This is confirmed in our analyses: when we control for health status, elderly with less generous income package are not significantly different from elderly with more generous income packages regarding the use of health and social care services.

However, not finding significant effects of the old age income package on the use of health and social care services could also point to the fact that our initial hypothesis overestimated the possibility to 'shop' for health and social care services in Belgium. The access to – and thus the use of – a wide range of social care services is based on dependency tests, that take account of one's functional status (and not of one's income). Further, the use of social care services is expected to be supply-driven: it depends on the availability of these services in the near surroundings of the older person in need of care. With regard to formal care services, this could include for example the presence of a local service centre that provides the social care services that are needed by the needy individual. With regard to informal care, this involves the presence of a (potential) informal care giver (a child, a child-in-law, a neighbour, etc.), able and willing to give care to the older individual. This has been investigated more in detail by Declercq et al. (2009). They found for example that the use of formal care is significantly related to the supply of formal family care services (offered by public or private care services). The availability of more hours of formal family care services is positively related to hours of formal care used by the elderly population.

Nevertheless, one should take into account the limitations in the operationalisation of the quality of the health and social care services. Consequently, more detailed data are necessary to evaluate the role of the old age income package in the quality of the health and social care package. Also, we should bear in mind that our analyses do not allow us to compare the current situation with a situation without a national health insurance scheme. It thus is not possible to exclude the potential influence of other societal processes or other unmeasured background characteristics.

CHAPTER 11

FINAL REFLECTIONS ON THE PACKAGING PUZZLE

CHAPTER 11. FINAL REFLECTIONS ON THE PACKAGING PUZZLE

This dissertation started from the observation that the demographic process of ageing has increased the importance of the elderly in the overall population. Consequently, age-related issues are high on the agenda of researchers and policy makers. These issues often are based on the increased dependency that is associated with old age. Elderly are faced with different dimensions of increased dependency. In this dissertation we focused on the two most important dimensions of old age dependency, namely financial dependency and functional dependency. Our research concentrated on the mechanisms available to the elderly population to protect them against the negative consequences of these dimensions of old age dependency.

In this dissertation's final chapter, we will take a step back to get an overview of the work that was done. We do not aim to give a summary of the research findings, since each chapter in the dissertation was concluded with a critical reflection on the main findings. Yet, in this final chapter we wish to tackle a number of outstanding W's that are to be found in all PhD projects. Where did we started from? What does our research contribute? What could have been better? Where do we go from here? What do these findings imply for the future? In the next sections, we systematically address these W's and pinpoint the main findings of our research, things to be kept in mind, food for thought, etc.

1. Where did we start?

Our research was initiated by the observation that the population is ageing. The contemporary society is confronted with increasing groups of elders in the population. Not only the group of individuals aged 60 years and over has grown in importance, also the group of individuals aged 80 years and over has increased, and is expected to increase even further in the future. Given the growing weight of the older population in the overall population, old age related problems become more important for both researchers and policy makers. These old age related problems can be traced back to the concept of old age dependency and its negative consequences.

Our research focused on the two main dimensions of old age dependency: financial dependency and functional dependency. Because the older population has withdrawn from the labour market, they no longer can stand in for their own financial wellbeing. They are dependent on other sources and actors to protect their living standard and prevent them from falling into poverty. This was referred to as financial dependency. Further, given the strong link between age, health status and functional level, ageing confronts individuals increasingly with health problems and functional limitations. Consequently, they become

more and more dependent on specific services and actors providing health and social care services. This has been referred to as functional (or long-term care) dependency.

Our research was not limited to the observation of increasing financial and functional dependency among the elderly population. Instead, we focused on the wide range of mechanisms that are available for the elderly population to protect them against the negative consequences of old age financial and functional dependency. Theoretically, we approached this from the packaging perspective of Rainwater, Rein and Schwartz (1986). Rainwater et al. (1986) investigated the combination of income sources by households in Sweden, the United Kingdom and the United States. They based their concept of the income package on the different claims that are made by households in different institutional spheres (the family sphere, the economic sphere and the political sphere). These claims have to contribute to the safety, security, welfare and wellbeing of the households. To a certain extent, this includes the mechanisms that have been developed in the field of social policy in the contemporary welfare state. However, also other mechanisms, not situated in the field of social policy, are considered as potential elements of the income package (e.g. personal savings, property ownership).

We have used the packaging concept to investigate the mechanisms that are used by the older population to protect themselves against the financial and functional dimension of old age dependency. Our puzzle focused on the composition of these income and care packages, on the level of protection that is provided against the two dimensions of old age dependency, and on the linkages between the income and the care packages. In addition, by including the sociodemographic and socioeconomic background of the research population, we also wished to shed light on differences and potential inequalities among the elderly concerning the protection they enjoy against old age dependency. To solve the packaging puzzle, we investigated thoroughly the wide range of income sources and health and social care services that are available to the Belgian elderly population. Empirical analyses, based on a subsample of the second wave of the SHARE, were used to verify the clustering of income and care sources into packages, as well as to investigate differences within the elderly population concerning the composition and the level of protection that is provided by these packages.

2. What does our research contribute?

Our research contributes in different ways to the debate on the protection of the elderly population against the two most important dimensions of old age dependency. Overall, the main contribution of the research is that is investigates a societal and political hot topic: the demographic process of population ageing has placed several ageing related topics high on the agenda of policy makers. Investigating the protection of the elderly population against the main dimensions of old age dependency thus proofs to be very important for policy makers challenged by the consequences of population ageing on the one hand, and urged to maintain loyal to the basic characteristics of the contemporary welfare state on the other hand. Our research touched upon several interesting issues within this context: the combination of a wide range of income and care sources into so-called income and care packages; the

inequalities within the elderly population in these income and care package; the potential of including asset ownership as a part of the old age income package; the relationship between the income and the care package, etc. In this way, our research provides food for thought for (social) policy makers.

In addition, we have extended the theoretical packaging approach of Rainwater, Rein and Schwartz (1986) in two ways. First, while the original concept of Rainwater et al. (1986) was limited to the active population, we used it to investigate the elderly population. In the second chapter of this dissertation, we extensively discussed how the notions of claims, rewards and institutional spheres – that are central in the theoretical framework of Rainwater et al. (1986) – can be adopted to study the use of a wide range of protective mechanisms of the elderly population. Secondly, while Rainwater et al. (1986) limited the sources in their packaging concept to monetary income sources, we included both monetary and non-monetary sources contributing to the welfare and wellbeing of the elderly population. Again, the notions of claims, rewards and institutional spheres proved to be useful to investigate non-monetary sources of protection, more specifically those sources that provide protection in case of functional dependency. We added an empirical test to investigate whether the theoretical reflections on the clustering of sources into packages is confirmed in reality. In the empirical analyses, cluster analysis was used as the statistical technique to investigate the existence of clusters of income sources and care sources. This confirmed the existence of a clustering of income and care sources into resp. income and care packages. Moreover, the results of the cluster analyses allowed us to demarcate empirical, data-driven package solutions rather than imposing our own (theory-driven) potential cluster compositions to the data.

Thirdly, our empirical analyses provide detailed information on the income package of the elderly population. Our research does not only include a wide range of income sources with personal ownership, like first, second and third pillar pensions, but also pays extensive attention to the potential contribution of asset sources, like savings and property ownership. By taking a holistic perspective on the combination of different, both public (social policy related) and private, income sources into income packages providing protection against the financial dimension of old age, our research adds importantly to the empirical research on the income protection of the Belgian elderly population. Little detailed information was found to be available on the combination of first, second and third pillar pensions by Belgian pensioners, as well as on the potential of such combinations to contribute to protecting the former living standard of the older population during their retirement. Moreover, the potential contribution from financial assets and property assets to the old age income package was not yet investigated in its complete extent. The holistic perspective, that we adopted, allowed us to investigate thoroughly the potential contribution assets could have to the old age income package. Investigating assets as such is not new in the research field, however, including combinations of assets and 'regular' personal income sources does shed some new light on the protection the elderly population enjoys against the financial dimension of old age dependency. We found that, although asset ownership is widespread among the Belgian elderly population, inequalities in the personal income package are transferred to the asset stock. This provides food for thought for the policy debates on the

potential role assets could play in safeguarding the living standard of the elderly population. Similarly, we found that in Belgium, asset ownership, and particularly home ownership, is widespread, but that important inequalities prevail. For example, individuals with low incomes from personal income sources, older women and the oldest elderly tend to be disadvantaged. Inequalities in the personal old age income package are transposed to the asset package, which illustrates a Mathew effect in the old age income protection. Elderly with low personal income sources have less access to asset sources, and the (potential) revenues from these sources tend to be lower. To a certain extent, we also found a strong link between the old age income package and the previous labour market status, in that a higher occupational status is related to more generous old age income packages. Policy makers, keen to include assets in the calculation of pensions, should be aware of the consequences of this. Income inequality among the elderly population is expected to increase, and income differences between the elderly will become more pronounced when assets are structurally included in the old age income package (cf. infra). In addition, this could have consequences for the protection the elderly population enjoys in other societal fields that are closely related to income protection (e.g. the potential to participate in a social and cultural events).

Fourth, and closely related to the previous paragraph, our research paid extensive attention to the relationship between the old age income package and the old age care package. We focused on whether inequalities in the old age income package are transposed to the old age care package. The literature review indicated a strong focus on the role of personal income sources in explaining care use. Little attention is paid to the possible contribution of asset sources in explaining differences in the use of health and social care services. Our expectation was that asset sources, irrespective of their direct contribution to the available income, can induce a certain consumption behaviour that is related to an increased use of health and social care services. To investigate this empirically, we have estimated different models with the use of care services as the dependent variable and the different income sources as independent variables. However, in contrast with our expectations, overall we did not find a significant relationship between the old age income package and the old age care package. Asset ownership did not induce differences in the care use of the elderly population. The main explanation for the absence of a statistically significant relationship between the income and the care package was found in the extensive health insurance scheme that has been developed in Belgium and that provides broad financial compensations for the use of a wide range of health and social care services. This points to a so-called 'decommodification' of the use of health and social care services by the national health insurance scheme in Belgium. While the sources in the old age income package show a strong link with the previous labour market situation, and evidence of 'commodification' is found in the composition and generosity of the asset package, this is not the case for the health and social care package. Our empirical analyses indicate that inequalities in the use of care services are not directly related to inequalities in the old age income package. However, although our analyses do not show a significant relationship between the old age income package and the old age care package, we may not forget that for a small group of the elderly population, those with a very low income, access to health and social care services is problematic. This group remains under the radar in our analyses, probably because this group represents only a very small part of our research population.

3. What could have been better?

The third "W" addresses the main weaknesses of our research. Every critical and conscious social scientist must be aware of the downsides of his or her research, and of the consequences of this for the research results. The weaknesses often stem from the choices that are made at the onset and during the research process. Indicating these weaknesses on its turn is necessary for a complete understanding of the research results, and, it can expose opportunities for future research (cf. infra).

Certain limitations of the research are inextricably bound up with the choice for a certain research design. In our research, the choice for a quantitative research design was initiated by the research questions. Given the strong focus on describing the income and care packages of the elderly population, as well as the aim to explain differences in these packages, a quantitative research design was the most obvious choice. In addition, the availability of an interesting and rich dataset as that from the Survey of Health, Ageing and Retirement in Europe explains our choice not to collect our own data, but to rely on a secondary data analysis. However, the secondary, quantitative research design that was set up, did not only hold the opportunity for an interesting view into the income and care packages of the elderly population, it also had some downsides that could have consequences for the validity of our research results.

First, our research shows how the empirical research design challenges the initial theoretical aspirations of the research. In the empirical part of this study we were confronted with the boundaries of what could be measured via survey questionnaires. The wide range of potential sources that were distinguished in the theoretical exploration of the old age income and care package proved to be too complex to be captured in a survey format. Income and care services are not questioned with the high degree of detail that would be necessary to get a complete picture of the old age income and care package. Consequently, simplifications and limitations in the sources to be included in the income and care packages were inevitable.

Moreover, it is imaginable that individuals are not always capable or willing to correctly name the income and care services they receive. In addition, the registration of certain income sources, like second and third pillar pensions that were received as lump sum payments in the years preceding the survey, is not watertight. In chapter 7 of this dissertation, we showed that the registration of second and third pillar pensions in the SHARE is limited to the pensions received in the year preceding the survey. An alternative route was followed to trace the receipt of second and third pillar pensions in the past by using information from the retrospective SHARELIFE survey. However, we are fully aware of the suboptimal character of this strategy and the fact that certain elderly that have received

second and third pillar pensions, remain under the radar and are not registered as having received these types of pensions in our data.[150]

Using administrative data records instead of survey data could partially overcome this problem, because all income and care services that are granted via the official circuits could be included here. Moreover, when working with administrative data records, researchers can be sure that the amounts registered are correct, and that neither memory effects nor reluctance of the respondents has an influence on the research results. Yet, this requires a complete registration of all income and care services that are received by the elderly population. However, in Belgium until now no global administrative data record exists including all sources of interest in this dissertation. Personal income data, for example, are partially available in the Datawarehouse Labour Market and Social Protection (i.e. all information on wages, public pensions, occupational pensions, social security benefits, other old age benefits). Yet, information on third pillar pensions, property ownership or financial asset ownership is not available in this datawarehouse. Similarly, the use of health and social care services is not captured as such in administrative data records. Data bases like the IMA databank[151] include information on the receipt of health care services, but this is not linked to information on the health status of the care receiver. In addition, information on the receipt of informal care is not registered in administrative data records, and thus cannot be captured in research that is limited to administrative data.

Third, the problems that are related to the use of secondary data in our research design are not limited to the degree of detail in the data or the quality of the registered answers, but also include the demarcation of the research population. Again, we are confronted with the boundaries of survey research in that the target population of the Belgian SHARE does not include elderly that permanently live in residential care facilities. In chapter 6 of this dissertation, we estimated that this leads to an exclusion of about 6% of the Belgian elderly population. Such an exclusion would not be worrisome when the institutionalized population is not very different from the rest of the older population. However, from the research of Peeters, Debels and Verpoorten (2013) we know that this is not the case. Excluding

[150] When we compare our main findings with similar findings based on data from administrative data records, we find that the overall trends are the same. Both in our research and in the research based on administrative data records (based on the analyses presented in the Belgian Pension Atlas (Berghman et al., 2010)), the oldest elderly and women are found to have the lowest pension protection. Also the trend that second pillar pension ownership is higher among individuals with more generous first pillar pensions to a certain extent is confirmed in both our research and the research based on administrative data records (Berghman et al., 2010). A complete comparison of our survey-based findings and the findings based on administrative data in the Belgian Pension Atlas is not possible because of the different calculation of the income levels. For example, in our research the level of the personal old age income package includes not only pension incomes but also incomes from labour and from social security benefits. In the Belgian Pension Atlas (Berghman et al., 2010), the amounts are limited to first and second pillar pension incomes, and do not include wages, social security benefits or private payments.

[151] The IMA databank is based on the registrations of health care services by the InterMutualistisch Agentschap (overall National Health Insurance Agency). For more information, see http://www.nic-ima.be.

institutionalised elderly leads to an underrepresentation of female pensioners and the oldest elderly (85 years and over) and an overrepresentation of male pensioners and younger elderly (60-74 years). Given the statistically significant relationship between sex, age and the generosity of the old age income package, excluding institutionalised elderly can have consequences for our research results.[152] For example, the exclusion of institutionalised elderly could result in an overestimation of the generosity of the old age income package, because overall the old age income package of institutionalised elderly is less generous than that of non-institutionalised elderly. According to the analyses of Peeters, Debels and Verpoorten (2013), based on Belgian register data, the average equivalent pension income of institutionalised elderly is significantly lower than that of the non-institutionalised elderly (a difference of 148 Euros on average). Moreover, the proportion of elderly receiving an Income Guarantee benefit is importantly larger in the institutionalised population than in the non-institutionalised older population (resp. 15.7% versus 5.3% receive an Income Guarantee benefit. In addition, institutionalised elderly have a very specific profile concerning their care use. They combine different types of health and social care services, they are known by a high intensity of care use and they rely to an important extent on social care services provided by formal care providers, while also the contribution of informal care providers may not be neglected[153]. In the Belgian national health insurance scheme increased reimbursements are included for institutionalised elderly, providing coverage for the health and social care services received. Residence costs and additional costs (for example for laundry, hair dresser, recreation, etc.) have to be covered by the elderly themselves. The restrictions in the SHARE research population makes it not possible to investigate this potentially very interesting group of institutionalized elderly.[154]

However, not all limitations of the research are prompted by the empirical research design. Also theoretical and conceptual choices that are made in the beginning and during the research have certain consequences for the overall picture. Some of these choices and their consequences have been discussed in the preceding chapters, however, here we wish to stress one additional matter. At the onset of the research we have decided to limit the concept

[152] However, because the group of institutionalised elderly is a relatively small group in the overall research population, it is possible that the exclusion does not have an influence on the statistical significance of the different models that were calculated during the research process. This is confirmed by Peeters, Debels and Verpoorten (2013). The differences between the average pension incomes based on the total population and the non-institutionalised population are negligible: The difference ranges between 0.2 and 0.8%. Yet, when the receipt of the Income Guarantee benefit is considered, the exclusion of institutionalised elderly underestimates the important of the Income Guarantee scheme with about 10% (Peeters et al., 2013). Consequently, the exclusion of institutionalised elderly in survey research is expected to lead to an underestimation of the at-risk-of-poverty rate of the older population. Or, to put it differently, excluding institutionalised elderly leads to an overestimation of the quality of the old age income package.

[153] For example, a child that (occasionally) helps his/her parent with getting dressed or eating, while the parent permanently resides in a nursing home.

[154] We investigated the possibility to use the Belgian Health Interview Survey (HIS) to study the income and care packages of the institutionalised population. However, the income information included in the HIS does not have the degree of detail that is needed to sketch the old age income package (see chapter 6).

of old age dependency to its two main dimensions: financial and functional dependency. In doing so, we have decided not to discuss the other dimensions of old age dependency like mental dependency and social dependency. This does not mean that we do not acknowledge the potential contribution of the other dimensions of dependency to the overall wellbeing of the elderly population. However, our choice to limit our research to the two main dimensions of dependency was prompted by our aim to study not old age dependency as such, but to study the protective measures that are available to limit the negative consequences of old age dependency. In addition, limiting the dimensions of old age dependency to financial and functional dependency allowed us to study in depth the mechanisms available to the elderly population, rather than to study in width all dimensions of dependency. Yet and again, we wish to stress that this does not imply a denial of the importance of the other dimensions of old age dependency.

4. What's in it for the future?

In the last section of the final, reflective, chapter of this dissertation we wish to reflect on the last "W" to be answered: What's next? This includes challenges and recommendations for Belgian policy makers involved in the broad field of old age protection, as well as includes turning the weaknesses, discussed in the previous section, into opportunities for future research (4.1) and for policy changes (4.2).

4.1 Opportunities for researchers

This dissertation creates different opportunities for future research. More specifically, it would be very interesting and useful to investigate the income and care packages of the elderly population using register data. As discussed before, the use of register data is expected to increase the reliability of the research results. However, this implies that a wide range of data on incomes and the use of health and social care services is registered, which nowadays still not always is the case. In addition, it must be possible to link the different data sources to investigate the interplay between the income package and the care package. As discussed in a previous section of this chapter, the detailed registration of the use of health and social care services that is needed for such an investigation however is not yet available.

In addition, another important lack in our research is that the research population is limited to the elderly living at home. Elderly that permanently live in a residential care facility are excluded from the research population, because they are not included in the sample frame of the SHARE. However, it would be very interesting to investigate how this group of the elderly population "manages" their income and care packages. How does this group use its financial assets to pay for the – often high – costs of residential long-term care? Are institutionalised elderly obliged to sell their home to finance their stay in a nursing home? What differences can be found within the group of institutionalised elderly regarding their income packages? These are just some of the research questions that could be posed. Furthermore, an

investigation of the income package linked to differences in the care setting could be an interesting opportunity for future research. This could imply a comparison of the income package of elderly living at home, elderly in residential care settings and elderly in semi-residential care settings (i.e. service flats and other types of assisted living facilities). Attention could be paid to income inequalities between groups of elderly, as well as to the way they use assets to pay for health and (long-term) care. It would also be interesting to investigate how the older population handles the assets that were build up during the active life phase when they are confronted with issues of increasing care dependency. To what extent do elderly actually use their financial assets to pay for the use of health and social care services? Are elderly willing to use the financial potential of their property to pay for additional costs related to health and social care services? This and other related research questions ask for a detailed investigated of the way the older population handles his/her financial and property assets as a part of their income package.

Lastly, an extension of our research, that focused on the financial and functional dimension of old age dependency, with an investigation of the protection the older population enjoys against the other dimensions of old age dependency could shed an even broader picture on the overall wellbeing of the elderly population. This could include the "protection" against social isolation, and how this is related for example to the income and care package. It is not unthinkable that elderly with a broad social network have more access to informal social care than elderly without such a social network. Similarly, elderly with a more generous income package could have more financial means to participate in social associations and events, which on his turn has an influence on the social dimension of old age dependency. Investigating the links between the different dimensions of old age protection certainly holds many opportunities for future research.

4.2 Opportunities for policy makers

The detailed study of the income and care packages of the Belgian older population also holds opportunities and points of interest for policy makers involved in different policy fields like pension policy, health care, social care, housing, etc. We first reflect on the future challenges and opportunities for policy makers concerning the protection against the financial dimension of old age dependency (i.e. the protection provided by the old age income package). Secondly, we reflect on how policy makers should take account of protecting the elderly population against the functional dimension of old age dependency (i.e. the protection provided by the old age care package).

In this research the different components of the old age income package have been studied with a great degree of detail. First, second and third pillar pensions proved to be very important among the personal income sources; and financial assets and home ownership among the income sources that are shared within the household. Although asset ownership proved to be very important among the Belgian elderly population, the accumulation of income inequalities in the personal and the extended income package cannot be neglected. In chapter 8 of this dissertation, the empirical analyses showed that elderly with a more

generous personal income package tend to have a more generous extended income package, while elderly with a less generous personal income package tend to have a less generous extended income package. In addition, also inequalities in the personal income package were found. For example, elderly who combine different pension sources (first and second and/or third pillar pensions) often have a more generous personal old age income package than elderly with a less diverse old age income package. In the conclusions of chapter 8, we recommended policy makers to take account of these inequalities when they want to rethink the role of the government in the provision of old age income protection. For example, there is a growing body of opinion that increasing the role of (semi-)private income sources, like second and third pillar pensions, financial assets, etc., could reduce the financial challenges faced by the public pension schemes due to the process of population ageing. However, account must be given to the potential consequences of this for the income equality within the older population.

In October 2014 the coalition agreements was presented by the new federal government, in which several proposals were put forward that could potentially influence the old age income package (Michel, 2014). Most importantly, the agreement emphasizes an increase in the generosity of the minimum income protection schemes, so that they are lifted above the EU-SILC at-risk-of-poverty threshold. For pensioners, this implies an increase in the Income Guarantee scheme for the elderly. In addition, the federal coalition agreement states that the minimum retirement pension of pensioners with a complete career must be 10% above the EU-SILC at-risk-of-poverty threshold. However, it must be mentioned that the federal coalition agreement remains quite vague about the actual efforts to realise this.

In addition, the federal coalition agreement foresees that pensioners without restrictions can combine a public retirement pension and a wage from labour (Michel, 2014). This is expected to increase the importance of wages in the old age income package, and can contribute to the potential of the old age income package to safeguard the standard of living after retirement. However, the consequences of this for the income differences among the elderly population must be studied thoroughly. It is thinkable that individuals that have worked in so-called "heavy" labour market segments are not able to continue working after their pensionable age, and thus will face an income disadvantage when compared to individuals in less "heavy" labour market segments who are less burdened by physical factors and have more opportunities to keep on working after their pensionable age.

Further, concerning second pillar pensions, the coalition agreement states that efforts will be done to encourage regular annuity payments in the second pension pillar instead of lump sum payments (Michel, 2014). Thus, second pillar pensions will have a regular, direct contribution to the old age income package, and are expected to be less hoarded up in savings accounts or spent on large (luxury) expenses, as is the case with lump sum payments. The contribution of the second pillar to the protection against the financial dimension of old age dependency thus is expected to become larger. However, in our opinion, too little attention is paid to removing existing inequalities in the access to and the financial importance of second pillar pensions. To make the second pillar pension a valuable part of the old age income package, ownership among the older population must be distributed more evenly, and the financial importance of (already existing) second pillar pension schemes must be increased.

In addition, in the last state reform the responsibility on the housing bonus is transposed from the federal policy level to the regional policy level (Belgische Federale Overheidsdiensten, 2014). This creates opportunities for the regions to reform the housing bonus. For example, in Flanders the remodelling of the housing bonus leads to a reduction in the fiscal deducible amount and detaches the level of the tax exemption from the level of the household income (Turtelboom, 2014).[155] Overall, this is expected to reduce the government support households will receive when buying a house. The consequences for the distribution of home ownership among the population (and the future elderly population) are unknown. Overall, we expect that reducing the importance of the housing bonus without a valuable alternative is expected to disfavour the capabilities of households to obtain home ownership, although the fixed tax rate for the calculation of the housing bonus is expected to be more favourable for low-income households than for high-income households (see, among others, Heylen, 2014).[156,157] Given the great importance of home ownership for the protection of the elderly population against the financial dimension of old age dependency, this is expected to have important consequences for future generations of elderly. While nowadays home ownership can be considered as a buffer against financial destitution, particularly for low-income households, reforms in the housing bonus can reduce this buffer function of property ownership, thus disfavouring future elderly households. In particular households with incomes below the average household income, yet not in the lowest income quintile, are expected to face more problems in obtaining home ownership. In addition, minister Homans (2014), responsible for housing policy, has decided to terminate the subsidies for social private property in Flanders. This probably will make home ownership more difficult for low-income households, with the same potential risks for the protection of future generations of (low-income) pensioners against the financial dimension of old age dependency.

Concerning the use of health and social care services, our study did not find a statistically significant relationship between the income and the care package of the elderly population. The use of health and social care seems to be decommodified by the widespread and quite generous national health insurance scheme. This national health insurance scheme provides financial compensations for a wide range of health and social care services for almost the entire Belgian population. However, two considerations are in place here. First, the fact that we do not find a statistically significant relationship between the generosity of the old age

[155] Whereas before 2015 the level of the housing bonus depended on the marginal tax rate, since 2015 a fixed tax rate is used for the calculation of the housing bonus.

[156] Research of Heylen (2013) on the distributional impact of housing subsidies in Flanders indicates that the mortgage tax relief overall disfavours low-income households because of several reasons: The fiscal advantage of the housing bonus increases with the income level (although this partly will be ruled out by the change to a fixed tax rate), high-income households are overrepresented among mortgage owners, and high-income households have a higher mortgage capability than low-income households. This also is confirmed in the research of Goeyvaerts et al. (2014).

[157] Also remarkable is that these changes in the housing bonus are not discussed as a part of the Flemish housing policy (in the policy notes of minister Homans on housing), but as a part of the Flemish fiscal policy. We wonder whether this implies that the housing bonus is not considered as a tool to encourage home ownership among the population, but merely is conceived as a fiscal instrument. This discussion is also part of the PhD research of Heylen (2014).

income package and the overall care use of the elderly population does not mean that there are no groups in the older population that are faced with important problems regarding the access and the use of health and social care services. As discussed in the conclusion of chapter 10, a small group of elderly with a very low income is expected to have less access to health and social care services because of their income situation and other related factors (like low levels of education). Yet, this group probably is underrepresented in the sample that was investigated in this dissertation, and thus remains 'under the radar'. Secondly, the lack of a significant relationship between income and care within the elderly population at no point may be used to justify cutbacks in the national health insurance scheme. Luckily, at the first sight, the coalition agreements presented in October 2014 do not point into that direction (Michel, 2014). Little concrete actions are included in the coalition agreements, yet, it is stated that a "qualitative, affordable and accessible health care must be guaranteed". Consequently, existing barriers in the access to the health care system must be reduced, for example by an automatic attribution of the third party payer's scheme for persons entitled to increased repayments in the national health insurance scheme. The current third party payer's scheme will be reformed, and priority will be given to increasing the access of the most destitute groups to a general practitioner (Michel, 2014). However, at no point concrete information is given on neither the pace nor the reach of this extension of the third party payer's scheme.

Further, with the sixth state reform, the responsibilities of the regions in the organisation and financing of social care services are increased (Belgische Federale Overheidsdiensten, 2014). In Flanders, the already existing care insurance is made part of a 'new' Flemish Social Protection system (Vandeurzen, 2014). No major changes in the care insurance scheme are foreseen: the insurance contributions, as well as the benefits, remain flat-rate. Neither an income correction, nor a link with the degree of care dependency is foreseen to be implemented in the Flemish care insurance scheme. In addition, in Wallonia the organisation of a care insurance scheme like in Flanders is not planned for the near future, despite the increase of regional competences in the field of social protection (Gouvernement Wallon, 2014). This implies that the differences between Flanders and Wallonia regarding the protection against the functional dimension of old age (i.e. long-term care dependency) are expect to increase.

With this final words said, it is now up to future researchers to fill in the gaps in what we currently know about the income and care packages of the elderly population. Policy makers on their turn must stay attentive for the inequalities among the elderly regarding their protection against the financial and functional dimensions of old age dependency.

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APPENDICES

APPENDIX 1. SHARE DATA STRUCTURE

1. Computer Assisted Personal Interview
1.1 Coverscreen module
General household information (e.g. household composition) Identification of different respondents (financial respondent and household respondent) Information collected before the start of the interview, provided by one household member
1.2 Individual modules
Information on 18 topics, collected at household and individual level: 1. Demographics 2. Physical health 3. Behavioral risks 4. Cognitive function 5. Mental health 6. Health care 7. Employment and pensions 8. Grip strength 9. Walking speed 10. Children 11. Social support 12. Financial transfers 13. Housing 14. Household income 15. Consumption 16. Assets 17. Activities 18. Expectations In the second wave, three additional modules were added: 1. Chair stand test 2. Peak flow test 3. End of life
1.3 Interviewer module
Interviewer observations on the interview, based on interviewer questionnaire after the interview
2. Paper and pencil questionnaires
2.1 Drop-off questionnaires
2.2 Vignette questionnaires
3. Generated variables
3.1 Generated variables
Thematically generated variables based on the individual modules: 1. Education – ISCED 2. Health 3. Housing and region 4. Occupation – ISCO and NACE 5. Support and household composition 6. Alive or deceased
3.2 Imputations
Imputed values for variables with item non-response
3.3 Weights
Different weights to correct for unit non-response

APPENDIX 2. THE CALCULATION OF THE WEIGHTS

We use weights to take account of differences between the sample population and the overall population that could influence our research results. Two types of weights are combined: design weights and poststratification weights. Design weights have to compensate for differences in the sampling probabilities stemming from the sample design and the sample framework. Poststratification weights have to compensate for unit non-response and the underrepresentation of certain population groups in the sample population. For the calculation of the combined weights, we follow the method of Pickery (2010).

In a first step, the design weights are applied. These weights are provided by the SHARE research team, and are calculated as "the inverse of the probability of being included in the [...] sample." (De Luca & Rossetti, 2010, p. 23). Table A2.1 shows the unweighted distribution of the sample by age and sex. Table A2.2 shows the distribution of the sample by age and sex after the application of the design weights.

Table A2.1. Distribution of the unweighted sample by age and sex

	60-64		65-69		70-74		75-79		80+	
	N	%	N	%	N	%	N	%	N	%
Sex										
Men	139	8	142	8	156	9	121	7	141	8
Women	220	13	202	12	183	11	179	11	209	12

Source: Author's calculations based on SHARE wave 2

Table A2.2. Distribution of the sample by age and sex, after the design weight

	60-64		65-69		70-74		75-79		80+	
	N	%	N	%	N	%	N	%	N	%
Sex										
Men	50765	8	51432	8	57249	9	43960	7	51994	8
Women	80190	13	74320	12	66881	11	65460	11	76613	12

Source: Author's calculations based on SHARE wave 2

In the second step, we calculate the poststratification weights taking account of the population distribution by age and sex. Table A2.3 shows the population distribution by age and sex.

Table A2.3. Population distribution by age and sex

	60-64		65-69		70-74		75-79		80+	
	N	%	N	%	N	%	N	%	N	%
Sex										
Men	285594	12	214874	9	200239	9	164521	7	154184	7
Women	296296	13	237845	10	238913	10	224829	10	273509	12

Source: Algemene Directie Statistiek en Economische Informatie (2009)

Following Bethlehem (2002), the post-stratification weights ($weight_{PS}$) are calculated per stratum of age and sex as:

$$weight_{PS} = \frac{N_h}{n_h} x \frac{n}{N}$$

in which N_h refers to the size of the stratum in the population, n_h refers to the size of the stratum in the sample, N to the total population size and n to the total sample size. In the calculation of the poststratification weights we already take account of the design weights. The poststratification weights are shown in Table A2.4.

Table A2.4. Poststratification weights by age and sex

	60-64	65-69	70-74	75-79	80+
Sex					
Men	5.6258	4.1778	3.4977	3.7425	2.9654
Women	3.6949	3.2003	3.5722	3.4346	3.5700

The final weights equal the product of the poststratification weights and the design weights. In a third step the final weights are rescaled so the mean of the weights equals 1. This has to ease the interpretation of the research results. The final weighted sample distribution by age and sex is show in Table A2.5. After application of the combined weights, the relative sample distribution by age and sex equals the relative population distribution in Table A2.3.

Table A2.5. Distribution of the sample by age and sex, after the application of the combined and rescaled weights

	60-64		65-69		70-74		75-79		80+	
	N	%	N	%	N	%	N	%	N	%
Sex										
Men	210	12	158	9	147	9	121	7	113	7
Women	218	13	175	10	175	10	165	10	201	12

Source: Author's calculations based on SHARE wave 2

APPENDIX 3. CONSEQUENCES OF THE METHODOLOGICAL CHOICES: A SENSITIVITY ANALYSIS

In our research design we made several methodological choices. Although we seriously reflected on these choices, we cannot neglect the potential influences of these methodological interventions on the research results. Sensitivity analysis is a widely used approach to evaluate the consequences of the methodological choices made during the research, and, to put it differently, to investigate "these potential changes and errors and their impacts on conclusions to be drawn from the model." (Pannell, 1997, p. 139). If the model results are insensitive to changes in the parameters, this increases the reliability of our research results. If not, we can use the results of the sensitivity analysis to evaluate the extent to which our methodological choices influence our research results.

In the next three sections, we focus on the influence of the weighting parameters to compensate for unit non-response (section 1), the inclusion of imputed values to compensate for item non-response (section 2), and the use of equivalence scales to take account of returns of scale within households (section 3). In all sections, we evaluate the main descriptive statistics as well as the results of a number of multivariate models.

1. Weights

An exploration of the SHARE data showed that the survey is prone to a quite extensive degree of unit non-response. We estimated that only 36% of the initial sample of individuals was actually interviewed in the first wave (see chapter 6). Because the non-responding part of the target population can be different from the responding part of the target population, non-response bias is likely to occur. However, because we do not have information on the non-responding part of the target population, we were not able to completely compare the responding and the non-responding part of the target population. The only option available was to compare the realized sample with the target population on a number of basic characteristics (i.e. age and sex). This showed an undercoverage of men and individuals between 60 and 64 years in the sample. To compensate for the differences between the realized sample and the target population, we included poststratification weights that were calculated taking account of the population distribution by age and sex. In chapter 6, we mentioned that the use of weights can increase the standard error and the variance in the variables, which can affect the reliability of the research results. In this section, we will evaluate the influence of the weights on the main model results. In doing so, we compare the main model results including and excluding the weights, no other changes to the models are made.

1.1 Comparison of the weighted and unweighted univariate distribution

Table A3.1 shows the weighted and unweighted univariate distribution of the main categorical variables in our research: the personal income package composition, the composition of the asset package and the health and social care package composition. The last column (Δ) indicates the difference in terms of percentage between the weighted and the unweighted distribution.

Table A3.1. Comparison of the weighted and unweighted distribution of the research population by personal income package composition, asset package composition, and care package composition (2007)

	Including weights		Excluding weights		Δ
	N	%	N	%	%
Personal income package					
P1	542	32	569	34	-4.9
P2+P1	148	9	149	9	-0.5
P1+P3	473	28	477	28	-0.9
SS+other	133	8	116	7	13.1
Wage+other	94	6	85	5	10.0
Only P3	109	7	107	6	2.0
None	176	11	183	11	-3.8
Asset package					
No assets	24	2	24	1	0.3
Financial assets	297	19	306	19	-2.9
Financial assets+property ownership	1.249	78	1.249	78	0.0
Only property ownership	26	2	27	2	-5.6
Care package					
Minor care use	486	29	466	29	4.1
Second-line health care	374	23	370	23	1.0
Hospital care	205	12	197	12	3.8
Informal home help	231	14	223	14	3.5
Formal home help	141	9	145	9	-2.8
Informal personal care	69	4	65	4	5.4
Mixed care package	145	9	144	9	0.9

Note: "Δ" indicates the difference in terms of percentage between the weighted and the unweighted distribution.

Source: Author's calculations based on SHARE data wave 2

The differences between the weighted and the unweighted distribution tend to be relatively small. The most outstanding difference is found in the personal income package composition: including weights leads to an overrepresentation of elderly with social security benefits (difference of 13%) and elderly with a wage (difference of 10%). Elderly that only have a first pillar pension, as well as elderly without personal income sources are somewhat underrepresented in the weighted analyses (a difference of resp. 5% and 4%). Regarding the asset package composition, elderly with financial assets and elderly with only property ownership tend to be underrepresented in the weighted analyses. But, because the share of these groups in the overall population is relatively small, this does not affect the overall distribution. The same is found for the care package composition:

including weights tends to overrepresent certain groups, but without influencing the overall distribution.

In addition, we also compare the most important means and medians (i.e. generosity of the personal income package, the direct and simulated asset contribution, and the direct and simulated total income) with and without weights in the calculations (see Table A3.2).

Again, we do not find major differences between the weighted and the unweighted statistics. The difference is never larger than 2%. The personal income package is a little more generous when weights are included in the analysis. On average, the weighted average level of the personal income package is about 26 Euros higher than the unweighted average level (1300 Euros vs. 1274 Euros). However, no difference between the weighted and the unweighted median of the personal income package is found. This indicates that the inclusion of weights tends to ascribe a higher weight to elderly with a higher income than to elderly with a lower income. The same is found to be true for the direct asset contribution.

Table A3.2. Comparison of the weighted and unweighted mean and median contribution from the personal income package and the asset package (2007)

	Including weights	Excluding weights	Δ	
			N	%
Personal income package				
Mean	1300	1274	25.76	2.0
Median	1067	1064	3.03	0.3
Direct asset contribution				
Mean	165	162	2.60	1.6
Median	28	28	-0.20	-0.7
Simulated asset contribution				
Mean	1442	1469	-27.94	-1.9
Median	926	930	-4.79	-0.5
Direct total income				
Mean	1458	1428	30.66	2.1
Median	1167	1157	10.34	0.9
Simulated total income				
Mean	2734	2735	-1.14	0.0
Median	2122	2123	-0.92	0.0

Note: "Δ" indicates the difference in terms of percentage between the weighted and the unweighted means and medians.

Source: Author's calculations based on SHARE data wave 2

1.2 Comparison of the weighted and unweighted model results

In this section we focus on the potential influence of the weights on the results of the main models. First, we investigate the logistic regression model that was estimated with the personal income package composition as the dependent variable (Table A3.3). The differences between the weighted and the unweighted model are minor: the variables that are significant in the weighted model, also are significant in the unweighted model.

Table A3.3. Comparison of the weighted and unweighted global parameter statistics of the multinomial logit model with composition of the personal income package as dependent variable (2007)

	Including weights		Excluding weights	
	Wald Chi²	***P***	**Wald Chi²**	***p***
Sex	99.70	<0.0001	94.79	<0.0001
Age	125.00	<0.0001	122.88	<0.0001
Occupational status	120.88	<0.0001	119.12	<0.0001
Education	35.29	<0.0001	34.77	0.00
Living situation	99.30	<0.0001	106.63	<0.0001
Region	26.01	0.01	24.69	0.02

Source: Author's calculations based on SHARE data wave 2

Secondly, we compare the multivariate regression model with the level of the personal old age income package as the dependent variable, with and without weights (Table A3.4). Again, no differences are found in the significant variables. We do however find some differences in the parameters. For example, the weighted parameter for sex is somewhat smaller than the unweighted parameter (resp. 47.50 versus 63.43). This stems from the different weights that are attached to sex in the weighted model.

Table A3.4. Comparison of the weighted and unweighted detailed parameter statistics of the multivariate robust regression model with equivalent net income from the personal income package (in Euro) as the dependent variable (2007)

	Including weights		Excluding weights	
	b	***p***	**b**	***p***
Intercept	862.11	<0.0001	866.86	<0.0001
Income source (reference: P1)				
P2+P1	95.69	0.03	90.21	0.03
P1+P3	77.42	0.01	79.26	0.01
SS+other	0.28	0.99	10.45	0.82
Wage+other	208.82	0.01	233.46	0.00
Only P3	-467.48	<0.0001	-444.54	<0.0001
None	-551.91	<0.0001	-528.87	<0.0001
Sex (reference: female)				
Male	47.50	0.65	63.43	0.54
Age (reference: 75+)				
60-74	10.22	0.68	8.96	0.71
Occupational status (reference: no occupation)				
Salariat	50.52	0.54	46.68	0.56
Intermediate	-54.46	0.41	-52.91	0.41
Working class	-55.29	0.31	-40.31	0.44
Level of education (reference: low)				
High	195.26	0.06	192.87	0.06
Intermediate	22.77	0.70	24.39	0.66
Living situation (reference: single)				
Couple	321.01	<0.0001	312.58	<0.0001
Region (reference: Brussels)				
Flanders	67.15	0.27	53.33	0.35
Wallonia	117.29	0.06	97.97	0.09
Interaction effect of sex and occupation				
Male*Salariat	-2.33	0.98	-13.87	0.90
Male*Intermediate	4.55	0.97	-5.66	0.96
Male*Working class	60.68	0.58	42.50	0.69
Interaction effect of education and occupation				
High*Walariat	147.14	0.24	113.35	0.20
High*Intermediate	-148.81	0.24	42.87	0.57
High*Working class	-73.25	0.66	46.88	0.49
Mid*Salariat	88.89	0.32	156.51	0.20
Mid*Intermediate	31.12	0.69	-134.86	0.28
Mid*Working class	61.54	0.39	-94.55	0.58
Interaction effect of sex and living situation				
Male*Couple	-335.73	<0.0001	-337.24	<0.0001

Source: Author's calculations based on SHARE data wave 2

Thirdly, we compared the global model statistics of the weighted and the unweighted binomial logit models with resp. financial asset ownership and property ownership as the main dependent variables (Table A3.5). Again, we do not find differences in the variables that are significant in the weighted and the unweighted models.

Table A3.5. Comparison of the weighted and unweighted global parameter statistics of the binomial logit models with financial asset ownership and property ownership as dependent variables (2007)

	Financial asset ownership				Property ownership			
	Weighted		Unweighted		Weighted		Unweighted	
	Wald Chi^2	*p*	Wald Chi^2	*p*	Wald Chi^2	*p*	Wald Chi^2	*p*
Personal income package composition	10.32	0.11	10.16	0.12	16.95	0.01	15.41	0.02
Level of personal income	2.01	0.73	1.86	0.76	6.09	0.20	6.23	0.19
Sex	0.10	0.75	0.13	0.72	1.09	0.30	0.70	0.40
Age	0.68	0.41	0.76	0.38	8.23	0.00	7.61	0.01
Occupational status	11.23	0.01	9.24	0.03	14.45	0.00	14.36	0.00
Education	1.27	0.53	1.45	0.48	1.64	0.44	1.66	0.44
Living situation	7.24	0.01	7.84	0.01	38.66	<0.0001	39.29	<0.0001
Region	3.77	0.15	3.79	0.15	8.21	0.02	9.63	0.01

Source: Author's calculations based on SHARE data wave 2

Fourthly, Table A3.6 shows the detailed model parameters and their p-values for the multivariate regression models testing the direct and simulated contribution from asset sources. Concerning the direct asset contribution, we overall do not find differences in the variables that are significant in the weighted and the unweighted model. However, for the level of the personal income package, we see that in the weighted model the third income quintile (1000-1189 Euros) differs significantly from the reference category at the alpha-level of 0.05, while this is not the case in the unweighted model (resp. p=0.04 and p=0.08). Similarly, the p-value of the upper income quintile is just above the 0.05 level in the weighted model, while it is below the 0.05 level in the unweighted model. The differences in the parameters, however, are only minor.

Table A3.6. Comparison of the weighted and unweighted detailed parameter statistics of the multivariate robust regression model with direct and simulated equivalent monthly contribution from assets (in Euro) as dependent variable (2007)

	Direct asset contribution				Simulated asset contribution			
	Weighted		Unweighted		Weighted		Unweighted	
	B	p	b	p	b	p	b	p
Intercept	5.96	0.45	7.19	0.36	746.29	<0.0001	702.04	<0.0001
Personal income package (reference: P1)								
P2+P1	8.57	0.09	8.24	0.09	296.59	0.00	263.75	0.00
P1+P3	8.60	0.01	8.15	0.01	175.47	0.00	160.61	0.01
SS+other	4.23	0.43	3.95	0.50	-39.48	0.65	-42.27	0.65
Wage+other	-7.70	0.21	-5.83	0.35	75.43	0.46	86.28	0.41
Only P3	2.33	0.67	3.29	0.54	147.47	0.11	151.89	0.10
None	11.42	0.02	12.19	0.01	91.93	0.27	115.55	0.16
Personal income level (reference: <760 Euros)								
760-999	4.32	0.26	3.81	0.30	-124.50	0.08	-93.23	0.16
1000-1189	9.23	0.04	7.64	0.08	-133.74	0.08	-81.06	0.27
1190-1571	10.37	0.01	10.71	0.01	-129.73	0.08	-133.91	0.06
≥1572	8.48	0.05	9.67	0.02	60.12	0.43	63.98	0.37
Sex (reference: female)								
Male	0.69	0.81	0.68	0.81	1.98	0.97	1.46	0.98
Age (reference: 75+)								
60-74	3.54	0.23	3.78	0.21	-228.14	<0.0001	-235.06	<0.0001
Occupational status (reference: no occupation)								
Salariat	0.27	0.96	-0.76	0.88	-76.29	0.35	-61.30	0.45
Intermediate	3.79	0.42	4.23	0.36	-94.16	0.25	-50.27	0.54
Working class	-3.30	0.46	-3.80	0.39	-256.94	0.00	-242.29	0.00
Level of education (reference: low)								
High	25.32	<0.0001	24.05	<0.0001	374.91	<0.0001	394.76	<0.0001
Intermediate	9.86	0.00	10.06	0.00	198.09	0.00	198.80	<0.0001
Living situation (reference: single)								
Couple	4.74	0.14	4.13	0.19	-32.38	0.53	-31.70	0.53
Region (reference: Brussels)								
Flanders	7.34	0.28	7.74	0.23	444.60	0.00	457.82	<0.0001
Wallonia	-9.97	0.14	-10.19	0.13	181.01	0.12	187.31	0.09

Source: Author's calculations based on SHARE data wave 2

In the multivariate regression model with the simulated asset contribution as the dependent variable, again no differences in the significant independent variables are found. The differences between the parameters, however, are larger. For example, in the weighted model the parameter of P2+P1 is 297, while in the unweighted model it is about 264, a difference of 34. Similarly, in the weighted model the parameters of the personal income level variable are lower than in the unweighted model.

Lastly, we also compare the global model statistics of the weighted and the unweighted multinomial logit models with the care package composition as the dependent variable (Table A3.7). In line with the previous findings, there are no differences in the variables that are significant in the weighted and the unweighted models.

Table A3.7. Comparison of the global parameter statistics of the weighted and unweighted multinomial logit model with the care package composition as dependent variable (2007)

	Including weights		Excluding weights	
	Wald Chi^2	P	Wald Chi^2	P
Personal income package	25.72	0.37	27.45	0.28
Personal income level	36.51	0.45	33.43	0.59
Subjective health status	27.71	0.00	30.09	<0.0001
Multimorbidity	33.51	<0.0001	35.42	<0.0001
Multi health symptoms	42.04	<0.0001	41.90	<0.0001
Multi ADL limitations	38.64	<0.0001	44.51	<0.0001
Multi IADL limitations	29.51	<0.0001	31.65	<0.0001
Sex	14.16	0.03	12.10	0.06
Age	50.86	<0.0001	55.64	<0.0001
Occupational status	27.29	0.07	25.52	0.11
Education	12.60	0.40	16.68	0.16
Living situation	63.89	<0.0001	59.65	<0.0001
Region	15.81	0.20	15.74	0.20

Source: Author's calculations based on SHARE data wave 2

1.3 Conclusion

Based on the comparisons of the weighted and the unweighted univariate distribution of the main variables of interest, as well as the comparison of the weighted and the unweighted models, we can conclude that little differences are found between the distributions, the model statistics, and the parameters of the weighted and the unweighted models. Consequently, it could be an option to leave out the weights in the analyses. However, because the weights compensate for small differences between the target population and the realised sample we have kept them in the analyses. The absence of important differences between the weighted and the unweighted distributions and models contributes to the reliability of our research results, in that the inclusion of weights in the analyses does not bring about major changes in the research results.

2. Imputed values

Given our focus on the old age income package, income level variables have a central position in our research. Overall, income questions in surveys are prone to quite high degrees of item non-response. For several reasons, survey respondents are reluctant to give (detailled) information on their income (e.g. because they don't know the exact amount, because they consider this as personal information, etc.). In the SHARE, an unfolding brackets procedure was used to limit item non-response on the income questions. However, even when the answers of the unfolding brackets procedure were included, item non-response still remained considerable. An estimation based on relevant amount questions in the modules on employment and pensions, and assets and housing showed that, after the unfolding brackets procedure, 5% to 39% of the answers was missing (cf. chapter 6). To limit the negative effects of this item non-response, we decided to include imputed values. These imputations were provided by the central SHARE research team, and were the result of a multiple imputation procedure.

In this section, we recompute the main statistics and models to investigate the influence of the imputations on the research results. Again, we will not change other aspects of the models. Respondents with missing information (because we do not use imputed values) are not included in the analyses. Further, the analyses presented in the next sections are limited to the statistics and the models that could change when imputed values are left out of the analyses. Consequently, the univariate distribution of the composition of the packages as well as the multinomial logit model with the personal income package composition as the dependent variable are not included here.

2.1 Comparison of the univariate distributions including and excluding imputations

In Table A3.8 we calculated the mean and the median contribution from the personal income package, the asset package and the overall extended old age income package with and without imputations. A first important finding is that the exclusion of imputations leads to a strong reduction in the size of the population, specifically when assets are added to the old age income package. This is caused by the high degree of item non-response on asset questions, as discussed more in detail in chapter 6. Secondly, we find that the means are always higher when imputed values are included than when imputed values are left out of the analyses. For example, the mean personal income including imputations is almost 10% higher than the mean personal income without imputations (a difference of 127 Euros). This difference is even larger when the contribution from assets is concerned: the average direct asset contribution including imputations is about 22% higher than the average direct asset contribution without imputations.

Table A3.8. Comparison of the mean and median contribution from the personal income package and the asset package, with and without imputations (weighted, 2007)

	With imputations	Without imputations	Δ	
			N	%
Personal income package				
N	1630	1400		
Mean	1300	1173	127	9.7
Median	1067	1051	15	1.4
Direct asset contribution				
N	1596	581		
Mean	165	129	36	22.0
Median	28	19	9	30.6
Simulated asset contribution				
N	1596	613		
Mean	1442	1108	334	23.2
Median	926	804	122	13.2
Direct total income				
N	1566	611		
Mean	1458	1325	133	9.1
Median	1167	1122	45	3.9
Simulated total income				
N	1566	611		
Mean	2734	2291	443	16.2
Median	2122	1933	189	8.9

Note: "Δ" indicates the difference in terms of percentage between the means and medians with and without imputations.

Source: Author's calculations based on SHARE data wave 2

Based on the results presented in the previous table, we can conclude that including respondents with missing information on the amount questions via imputations leads to an overrepresentation of respondents with (estimated) higher income levels. This leads to higher means and medians in the statistics that include imputed values than in the statistics that leave out respondents with missing information.

2.2 Comparison of the model results including and excluding imputations

In addition to the univariate statistics presented in the previous section, in this section we recomputed the main models to investigate whether leaving out imputations changes the conclusions based on these models.

Table A3.9 compares the parameters statistics of the multivariate robust regression model with the equivalent net monthly income from the personal income package as the dependent variable, in the dataset with imputations and the dataset without imputations. Overall, we do not find major changes in the significance of the variables. Only P2+P1 is no longer significantly different from the reference category when we leave out the respondents with imputed values. As expected, the parameter values (b) change when we exclude observations with imputations. For example, leaving out imputations reduces the

parameter values of the categories P2+P1 and P1+P3. Since incomes tend to be higher for elderly combining a first pillar pension with a second and/or a third pillar pensions, this confirms our earlier finding that including imputations in the analyses overrepresents the higher income levels.

Table A3.9. Comparison of the detailed parameter statistics of the multivariate robust regression model with equivalent net income from the personal income package (in Euro) as the dependent variable, with and without imputations (weighted, 2007)

	With imputations		Without imputations	
	b	***p***	**b**	***p***
Intercept	862.11	<0.0001	876.79	<0.0001
Income source (reference: P1)				
P2+P1	95.69	0.03	82.88	0.06
P1+P3	77.42	0.01	69.30	0.02
SS+other	0.28	0.99	-20.13	0.65
Wage+other	208.82	0.01	219.61	0.00
Only P3	-467.48	<0.0001	-461.43	<0.0001
None	-551.91	<0.0001	-551.54	<0.0001
Sex (reference: female)				
Male	47.50	0.65	66.72	0.52
Age (reference: 75+)				
60-74	10.22	0.68	7.51	0.76
Occupational status (reference: no occupation)				
Salariat	50.52	0.54	38.33	0.66
Intermediate	-54.46	0.41	-70.34	0.29
Working class	-55.29	0.31	-102.54	0.06
Level of education (reference: low)				
High	195.26	0.06	134.10	0.18
Intermediate	22.77	0.70	0.96	0.99
Living situation (reference: single)				
Couple	321.01	<0.0001	329.86	<0.0001
Region (reference: Brussels)				
Flanders	67.15	0.27	76.46	0.20
Wallonia	117.29	0.06	122.81	0.04
Interaction effect of sex and occupation				
Male*Salariat	-2.33	0.98	-13.68	0.90
Male*Intermediate	4.55	0.97	3.16	0.98
Male*Working class	60.68	0.58	57.79	0.59
Interaction effect of education and occupation				
High*Walariat	147.14	0.24	92.82	0.32
High*Intermediate	-148.81	0.24	5.43	0.94
High*Working class	-73.25	0.66	75.01	0.30
Mid*Salariat	88.89	0.32	174.36	0.16
Mid*Intermediate	31.12	0.69	-65.12	0.61
Mid*Working class	61.54	0.39	-13.77	0.93
Interaction effect of sex and living situation				
Male*Couple	-335.73	<0.0001	-333.71	<0.0001

Source: Author's calculations based on SHARE data wave 2

Secondly, we assess the impact of imputations on the binomial logit models on financial asset ownership and property ownership. At the level of the global model statistics, presented in Table A3.10, we do not find major changes when we leave out the respondents with imputed values. When we do not include the respondents with imputed values on the personal income package, occupational status no longer is significant in explaining financial asset ownership. Similarly, for property ownership the significant effect of region (at the alpha-level of 0.05) disappears when imputed values are excluded.

Table A3.10. Comparison of the global parameter statistics of the binomial logit models with financial asset ownership and property ownership as dependent variables, with and without imputations (weighted, 2007)

	Financial asset ownership				Property ownership			
	With imputations		Without imputations		With imputations		Without imputations	
	Wald Chi^2	p	Wald Chi^2	p	Wald Chi^2	p	Wald Chi^2	p
Personal income package composition	10.32	0.11	9.42	0.15	16.95	0.01	15.93	0.01
Level of personal income	2.01	0.73	2.77	0.60	6.09	0.20	2.95	0.57
Sex	0.10	0.75	0.11	0.74	1.09	0.30	0.83	0.36
Age	0.68	0.41	1.25	0.26	8.23	0.00	8.37	0.00
Occupational status	11.23	0.01	6.28	0.10	14.45	0.00	12.86	0.00
Education	1.27	0.53	0.96	0.62	1.64	0.44	1.09	0.58
Living situation	7.24	0.01	8.34	0.00	38.66	<0.0001	34.75	<0.0001
Region	3.77	0.15	2.96	0.23	8.21	0.02	5.79	0.06

Source: Author's calculations based on SHARE data wave 2

Thirdly, Table A3.11 shows the results of the multivariate regression models on the direct and the simulated asset contribution, including and excluding imputed values. In the model with the direct asset contribution as the dependent, leaving out the imputed values removes the significant effect of having an income between 1000 and 1189 Euros (Q3). The changes in the parameters due to the exclusion of observations with imputed values seem to confirm that the inclusion of imputations tends to overrepresent elderly with a more diverse (thus a more generous) income package. For example, for the direct asset contribution the parameters of P2+P1 and P1+P3 are lower in the model without imputations than in the model with imputations.

The overall conclusions based on the model without imputations, however, are not very different from the main conclusions from the model with imputations. When we control for sociodemographic and socioeconomic background differences, in the model with imputations we still find that the direct asset contribution is significantly larger for elderly with a first and a third pillar pension than for elderly with only a first pillar pension. Similarly, the model shows that elderly with a more generous personal income package overall have a higher direct contribution from their assets than elderly with a less generous personal old age income package.

Table A3.11. Comparison of the detailed parameter statistics of the multivariate robust regression model with direct and simulated equivalent monthly contribution from assets (in Euro) as dependent variable, with and without imputations (unweighted, 2007)

	Direct asset contribution				Simulated asset contribution			
	With imputations		Without imputations		With imputations		Without imputations	
	b	p	b	p	b	p	b	p
Intercept	5.96	0.45	8.18	0.15	746.29	<0.0001	306.83	0.08
Personal income package (reference: P1)								
P2+P1	8.57	0.09	-4.39	0.23	296.59	0.00	344.28	0.00
P1+P3	8.60	0.01	4.96	0.04	175.47	0.00	168.91	0.02
SS+other	4.23	0.43	3.05	0.40	-39.48	0.65	122.11	0.27
Wage+other	-7.70	0.21	-1.93	0.71	75.43	0.46	-0.21	0.99
Only P3	2.33	0.67	2.41	0.53	147.47	0.11	270.04	0.02
None	11.42	0.02	8.88	0.02	91.93	0.27	258.75	0.02
Personal income level (reference: <760 Euros)								
760-999	4.32	0.26	0.40	0.90	-124.50	0.08	19.90	0.83
1000-1189	9.23	0.04	6.46	0.05	-133.74	0.08	0.40	0.99
1190-1571	10.37	0.01	10.65	0.00	-129.73	0.08	66.29	0.51
≥1572	8.48	0.05	9.72	0.01	60.12	0.43	185.89	0.09
Sex (reference: female)								
Male	0.69	0.81	-3.03	0.15	1.98	0.97	-71.61	0.27
Age (reference: 75+)								
60-74	3.54	0.23	-0.99	0.65	-228.14	<0.0001	-291.97	<0.0001
Occupational status (reference: no occupation)								
Salariat	0.27	0.96	4.92	0.15	-76.29	0.35	190.77	0.07
Intermediate	3.79	0.42	3.91	0.25	-94.16	0.25	131.57	0.21
Working class	-3.30	0.46	3.47	0.29	-256.94	0.00	-16.51	0.87
Level of education (reference: low)								
High	25.32	<0.0001	6.40	0.04	374.91	<0.0001	372.12	0.00
Intermediate	9.86	0.00	5.78	0.01	198.09	0.00	116.72	0.11
Living situation (reference: single)								
Couple	4.74	0.14	1.46	0.50	-32.38	0.53	10.65	0.87
Region (reference: Brussels)								
Flanders	7.34	0.28	-3.06	0.49	444.60	0.00	453.03	0.00
Wallonia	-9.97	0.14	-8.61	0.06	181.01	0.12	197.88	0.15

Source: Author's calculations based on SHARE data wave 2

Lastly, we evaluate the differences stemming from working with imputed values in the multinomial logit model with the care package composition as the main dependent variable. Table A3.12 shows the global parameter statistics of the multinomial logit models with and without imputations.

Table A3.12. Comparison of the global parameter statistics of the multinomial logit model with the care package composition as dependent variable, with and without imputations (weighted, 2007)

	With imputations		Without imputations	
	Wald Chi²	***p***	**Wald Chi²**	***p***
Personal income package	25.72	0.37	20.89	0.65
Personal income level	36.51	0.45	42.84	0.20
Subjective health status	27.71	0.00	19.95	0.00
Multimorbidity	33.51	<0.0001	29.39	<0.0001
Multi health symptoms	42.04	<0.0001	50.90	<0.0001
Multi ADL limitations	38.64	<0.0001	36.58	<0.0001
Multi IADL limitations	29.51	<0.0001	28.05	<0.0001
Sex	14.16	0.03	13.83	0.03
Age	50.86	<0.0001	42.15	<0.0001
Occupational status	27.29	0.07	28.38	0.06
Education	12.60	0.40	13.81	0.31
Living situation	63.89	<0.0001	56.69	<0.0001
Region	15.81	0.20	13.82	0.31

Source: Author's calculations based on SHARE data wave 2

No important differences are found in the global model statistics when we exclude respondents with imputed values from the dataset. Possibly this results from the fact that this model does not include variables related to the asset package. As shown before, excluding respondents with imputations lead to important changes when asset variables are included in the model. However, when only personal income package variables are included the differences between the dataset with imputations and without imputations are smaller.

2.3 Conclusion

Based on the comparisons of the univariate statistics of the main variables of interest, as well as the main models of interests, including and excluding respondents with missing information on the amount questions, we find that leaving out respondents with imputed values on the amount questions leads to important changes in the descriptive statistics as well as in the modelled parameters. Particularly when the contribution of assets is considered, leaving out respondents with imputed values has important consequences. This stems from the high degrees of item non-response in the amount questions in the module on assets (cf. chapter 6). Leaving out respondents with imputed values thus reduces importantly the research population. Moreover, leaving out respondents with

imputations on the amount questions tends to reduce the proportion of the higher incomes in the dataset. This leads to lower means, and to a reduced influence of certain variables in the model (for example, the personal income package composition). The overall conclusions from the different models, however, do not tend to change importantly when we exclude the respondents with imputed values on the amount questions.

3. Equivalence scales

To take account of the returns of scale that arise from living together with a partner, we used the OECD-modified equivalence scale. This scale was developed by Hagenaars et al. (1994), and nowadays is a very commonly used equivalence scale in social research (e.g. in the EU-SILC). The scale assigns a weight of 1 to the first adult household member; a weight of 0.5 to each additional adult household member; and a weight of 0.3 to each child in the household. Since we limited our research population to single living elderly and elderly living with a partner, we only used two equivalence factors: 1 for singles, and 1.5 for elderly living with a partner. However, we must be aware that the research results can change when we use a different equivalence scale. According to Förster (1994, p. 13) "As for the composition of the low-income population, almost by definition, the larger the elasticity [i.e. the larger the weight of each additional household member], the greater the share of large families (thus children) among the low-income population and the smaller the share of single persons (thus elderly) and older married couples." Using an equivalence scale that gives a lower weight to the additional adult household member, increases the equivalent income of couples and thus is expected to increase the share of couples in the high-income population. Consequently, singles are expected to be stronger represented in the low-income population, and the share of singles below the at-risk-of-poverty threshold will be larger.

To investigate how our choice for the modified OECD equivalence scale influenced our research results, we have recomputed the mean and median contribution from the personal old age income package. We also recalculated the age-specific poverty rates taking account of three different equivalence factors (see Table A3.13).[158]

[158] We include the age-specific poverty rate in the analysis presented here, because we were not able to recompute the EU-SILC correction factor with different equivalence scales. More details on the EU-SILC correction factor are provided in chapter 7. This correction factor is based on the EU-SILC net median equivalent income of the entire population. The modified OECD equivalence scale is used to take account of returns of scale within households.

Table A3.13. Overview of three commonly used equivalence scales

	Household income is divided by ...	Factor for couples
Oxford equivalence scale	... a factor that assigns a value of 1 to the first adult in the household; 0.7 to the following adults and 0.5 to every child in the household	1.7
OECD modified equivalence scale	... a factor that assigns a value of 1 to the first adult in the household; 0.5 to the following adults and 0.3 to every child in the household	1.5
Square root equivalence scale	... the square root of the number of household members	1.4

Source: Organisation for Economic Cooperation and Development (2009)

Table A3.14 compares the mean and the median income from the personal old age income package, and the related age specific at-risk-of-poverty rate based on the Oxford equivalence scale, the OECD modified equivalence scale and the square root equivalence scale. The at-risk-of-poverty rate is highest when the Oxford equivalence scale is used (14%), and lowest when the square root equivalence scale is used, though the difference between the poverty rate based on the modified OECD equivalence scale and poverty rate based on the square root scale is negligible (a difference of 0.07 percentage points).

As expected, when the Oxford equivalence scale is used, a higher proportion of elderly living with a partner is found below the poverty threshold. 16% of the elderly with a partner has an equivalent income below the poverty threshold, compared to 11% of the single-living elderly. When a lower weight is assigned to the second adult in the couple (i.e. when the square root equivalence scale is used), elderly without a partner become more apparent below the poverty threshold. In that case, 13% of the single-living elderly has an income below the poverty threshold, compared to 10% of the elderly living together with a partner. This confirms our expectations.

For our research it is important to keep in mind that using a different equivalence scale can change the poverty rate of certain groups in our research population. However, because in our research population the differences in the household composition are limited (i.e. one- or two-person-households) the influence of the equivalence scale on our conclusions is expected to be rather small. However, in more diverse population, including several household compositions, the influence of the equivalence scale used is expected to be more important.

Table A3.14. Comparison of the mean and median net monthly equivalent income from the personal old age income package and the age-specific at-risk-of-poverty rate, by the Oxford equivalence scale, the OECD modified equivalence scale and the square root equivalence scale (weighted, 2007)

	Oxford equivalence scale			OECD modified equivalence scale			Square root equivalence scale		
	Mean	Median	% below poverty threshold	Mean	Median	% below poverty threshold	Mean	Median	% below poverty threshold
Sex									
Male	1265	1000	14	1393	1100	11	1459	1135	10
Female	1139	1000	14	1225	1045	12	1269	1078	12
Age									
60-74	1280	1000	14	1405	1100	12	1470	1136	12
75+	1040	970	14	1106	1022	10	1140	1061	10
Occupational status									
Salariat	1490	1207	10	1635	1313	9	1709	1376	9
Intermediate	1163	945	19	1259	1004	16	1309	1056	16
Working class	991	942	11	1070	1000	8	1111	1040	7
None	909	879	23	978	937	19	1013	950	19
Education									
High	1621	1319	10	1771	1428	10	1847	1461	10
Intermediate	1142	987	14	1249	1061	12	1304	1099	12
Low	984	900	17	1057	967	12	1094	993	11
Living situation									
Couple	1217	955	16	1379	1083	11	1463	1148	10
Single	1156	1034	11	1156	1034	11	1156	1034	13
Total	**1195**	**1000**	**14**	**1300**	**1067**	**11**	**1354**	**1100**	**11**

Source: Author's calculations based on SHARE data wave 2

APPENDIX 4. COMPARING OBSERVATIONS WITH AND WITHOUT IMPUTATIONS

In this appendix, we reflect on the potential differences between the respondents for whom we have included imputed values on the personal income package and the respondents for whom no imputed values are included in the calculation of the level of the personal income package. We assess the differences between both groups of respondents on a number of background and income variables. Table A4.1 presents some sociodemographic and socioeconomic background characteristics, and Table A4.2 presents the composition of the personal old age income package. In each table the difference in percentage points between the distribution without and with imputations is show. Further, we have included the p-value of the Pearson Chi^2 test statistic to assess whether the differences between the groups are statistically significant.

Regarding the sociodemographic and socioeconomic background of the respondents without and with imputed values on the personal income level (Table A4.1), we find that among the respondents with imputed values the respondents aged 75 years and over are overrepresented with about 6 percentage points. Possibly this indicates that the oldest old have more difficulties in recalling exact income amounts, and thus have missing information on this type of variables. Further, among the respondents with imputations we find a small overrepresentation of individuals with an intermediate occupational status and individuals with a low level of education. However, according to the p-values, these differences are not statistically significant. Only for living situation we find an important difference between the respondents without and with imputations on the personal income level. Among the respondents with imputed values, single-living individuals are overrepresentated (a difference of 11 percentage points) (p=0.0015).

Concerning the personal income package composition, presented in table A4.2, we find that among the respondents with imputed values on the personal income level there is an overrepresentation of elderly with only a first pillar pension (a difference of 8 percentage points) and of elderly with a wage (a difference of 9 percentage points). Further, elderly with only a third pillar pension or without personal income sources are underrepresented among the elderly with imputed values (a difference of resp. 7 and 12 percentage points).

Table A4.1 Distribution of the research population without and with imputations on the personal income level by sex, age, occupational status, level of education, living situation and region of residence (weighted, 2007)

	Without imputations		With imputations			
	N	%	N	%	Δ	*p*
Sex						
Male	632	45	103	44	0	0.9251
Female	783	55	130	56	0	
Age						
60-74	926	65	139	59	-6	0.0767
75+	489	35	95	41	6	
Occupational status						
Salariat	474	35	80	35	0	0.8267
Intermediate	320	24	61	26	3	
Working class	401	30	64	28	-2	
None	157	12	25	11	-1	
Education						
High	311	22	44	19	-3	0.4758
Intermediate	647	46	105	46	0	
Low	445	32	81	35	3	
Living situation						
Couple	939	66	130	56	-11	0.0015
Single	477	34	104	44	11	
Region of residence						
Flanders	854	60	152	65	5	0.3853
Wallonia	510	36	74	32	-4	
Brussels	51	4	7	3	0	
Total	**1415**	**100**	**233**	**100**		

Note: "Δ" indicates the difference in percentage points between the observations without imputations and with imputations.

Source: Author's calculations based on SHARE data wave 2

Table A4.2 Distribution of the research population without and with imputations on the personal income level by personal income package composition (weighted, 2007)

	Without imputations		With imputations			
	N	%	N	%	Δ	*p*
Personal income package						
Only P1	436	31	92	39	8	<0.0001
P2+P1	122	9	24	10	2	
P1+P3	395	28	71	30	3	
SS+other	119	8	12	5	-3	
Wage+other	59	4	32	14	9	
Only P3	108	8	1	0	-7	
None	175	12	1	0	-12	
Total	**1415**	**100**	**233**	**100**		

Note: "Δ" indicates the difference in percentage points between the observations without imputations and with imputations.

Source: Author's calculations based on SHARE data wave 2

APPENDIX 5. PRINCIPAL LIMIT FACTORS

Table A5.1 shows the principal limit factors that are used to simulate the reverse mortgages, based on home ownership. These factors are based on the age of the individual and on the 2007 long-term interest rate of 4.33%. For couples, the PLF is based on the age of the partner with the longest remaining life expectancy.

Table A5.1 Principal limit factors used for the simulation of reverse mortgages, by age, at an interest rate of 4.33%

Age	PLF	Age	PLF
60	0.602	83	0.735
61	0.610	84	0.741
62	0.619	85	0.747
63	0.625	86	0.754
64	0.629	87	0.760
65	0.637	88	0.765
66	0.642	89	0.769
67	0.648	90	0.776
68	0.652	91	0.776
69	0.659	92	0.776
70	0.663	93	0.776
71	0.671	94	0.776
72	0.677	95	0.776
73	0.681	96	0.776
74	0.689	97	0.776
75	0.693	98	0.776
76	0.698	99	0.776
77	0.702	100	0.776
78	0.706	101	0.776
79	0.714	102	0.776
80	0.718	103	0.776
81	0.724	104	0.776
82	0.730	105	0.776

Source: US Department of Housing and Urban Development (2013)

APPENDIX 6. SIMULATING THE POTENTIAL CONTRIBUTION FROM ASSETS

We simulate the potential contribution from assets to include them in the extended old age income package. The simulation is performed separately for three asset sources: financial assets, home ownership and secondary residence ownership. Financial assets are transposed to monthly fictitious annuities ($An_{m,eq}$), assuming a complete spending of the asset stock. Any secondary residences are assumed to be sold and the proceeds are transposed to monthly fictitious annuities. Account is given to the total amount in assets and/or the secondary residences' value (NW_t); the 2007 long-term interest rate (r) for government bond yields with a maturity of 10 years for the united EURO-area (4.33 %) (based on the interest rate of an OLO reference loan with a duration of 10 years at the secondary market, provided by the National Bank of Belgium in its annual macro-economic statistics); and the remaining life expectancy (E_x) based on sex and age (Algemene Directie Statistiek en Economische Informatie, 2013). For couples, the remaining life expectancy of the longest living partner is used, assuming the payment of a *joint and full survivor annuity* (a fixed annuity before and after the decease of one of both partners) (Brown, 2002; Brown & Poterba, 2000). The fictitious annuities are made equivalent using the modified OECD equivalence scale (1 for singles, 1.5 for couples) (Hagenaars et al., 1994; Organisation for Economic Cooperation and Development, 2009). All components are included in the following formula (cf. Weisbrod & Hansen, 1968):

$$An_{m,eq} = \frac{\mathrm{NW_t} * \mathrm{r} * \frac{1}{1-(1+\mathrm{r})^{-\mathrm{E_x}}}}{12 * Equivalence\ factor}$$

For home ownership, we simulate monthly reverse mortgages ($RM_{m,eq}$), based on a percentage of the estimated property's value and the remaining mortgage (*HV-M*). This percentage, the principal limit factor (*PLF*), is drawn from the reverse mortgaging scheme of the US Department of Housing and Urban Development (2013) and is based on the long-term interest rate and age (for couples: age of the youngest partner) (cf. Lefebure et al., 2006; Verbist & Lefebure, 2008). The principal limit factors are included in appendix 5. The reverse mortgage is transposed to a fictitious annuity taking account of the 2007 long-term interest rate (r) (4.33%); the remaining life expectancy (E_x); and the equivalence factor (cf. Weisbrod & Hansen, 1968):

$$RM_{m,eq} = \frac{PLF * (HV - M) * r * \frac{1}{1-(1-r)^{-E_x}}}{12 * Equivalence\ factor}$$

To illustrate, we calculate the simulated contribution from a total financial asset stock of 10000 Euros; a house with an estimated value of 200000 Euros without a mortgage, and a

secondary residence worth 150000 Euros. The examples differ in living situation, sex, and age (see Table A6.1). As shown, the simulated contribution is always larger for singles than for couples (no sharing of sources), for men than for women (differences in remaining life expectancy), and for older than for younger (shorter remaining expected life span).

Table A6.1. Simulating the potential contribution from assets

	Partner 1		Partner 2		Financial assets	Home	Secondary residence
(1)	M	60	-	-	61	733	712
(2)	M	75	-	-	100	1372	1296
(3)	W	60	-	-	55	665	634
(4)	W	75	-	-	85	1201	1078
(5)	M	60	W	60	37	443	422
(6)	M	60	W	75	41	489	475
(7)	M	75	W	60	37	443	422
(8)	M	75	W	75	57	801	719

Notes: Rows 1 to 4 represent singles, rows 5 to 8 represent couples. Rows 1 and 2 represent single men of resp. 60 (1) and 75 years (2); rows 3 and 4 represent single women of resp. 60 (3) and 75 years (4). Rows 5 and 8 represent couples, where both partners are resp. 60 (5) and 75 years of age (8). Rows 6 and 7 represent couples where resp. the man (6) or the woman (7) is the youngest partner.

APPENDIX 7. OPERATIONALISATION OF THE BACKGROUND VARIABLES

1. Sex, age and living situation

Information on sex, age and living situation is derived from the SHARE coverscreen interview on individual level. Sex (man/woman) is noted by the interviewer, and asked for confirmation in case of doubt (cv005). Age is based on the year of birth (cv007) and the interview year; it thus refers to the actual age of the respondent at the moment of interview. Age is remodelled to a categorical variable with two categories: 60 to 75 years, and 75 years or older.

cv007 In what year were you born?
Numerical value (1900-2007)

Living situation differentiates between living single or living with a partner or spouse. For singles, no account is given to whether they are divorced, widowed or have never been married. For elderly living with a partner, no difference is made between marriage or (registered) cohabitation. Living situation is based on the following SHARE question (cv009):

cv009 Are you ...
1. Living with a spouse
2. Living with a partner
3. Living as a single

Table A7.1 gives the weighted distribution of the research population by sex, age and living situation.

Table A7.1. Distribution of the research population by sex, age and living situation (weighted, 2007)

	N	%
Sex		
Male	748	45
Female	934	55
Age		
60-74	1082	64
75+	600	36
Living situation		
Couple	1086	65
Single	596	35
Total	**1682**	**100**

Source: Author's calculations based on SHARE data wave 2

2. Labour market history: Occupational status

To include information on the labour market history of the respondent, one summary variable is included: occupational status. This is based on the European Socio-economic Classification (ESeC) of occupations, that uses occupation to explain social stratification (Harrison & Rose, 2006). The ESeC takes account of:

- the individuals' former employment position (whether one was an employee, an employer, self-employed, or not involved in the labour market);
- for employers: the number of people employed;
- for employees: the type of contract (labour contract versus service relationship).

The ESeC is divided in ten categories (see Table A7.2). For those not in paid employment, like retirees, reference is made to the last main paid job for their classification in the ESeC.

Table A7.2. The European Socio-economic classification of occupations

	European Socio-economic classification of occupations - Classes
1.	Large employers, higher grade professional, administrative and managerial occupations
2.	Lower grade professional, administrative and managerial occupations and higher grade technician and supervisory occupations
3.	Intermediate occupations
4.	Small employer and self-employed occupations (excluding agriculture etc.)
5.	Self-employed occupations (agriculture etc.)
6.	Lower supervisory and lower technician occupations
7.	Lower services, sales and clerical occupations
8.	Lower technical occupations
9.	Routine occupations
10.	Never worked and long-term unemployed

Source: Harrison & Rose (2006)

For the construction of occupational status, information is needed on one's (former) occupation, (former) employment status and (former) organisation size:

- occupations are coded to the International Standard Classification of Occupations (ISCO-1988) (ILO Bureau of Statistics, 2004);
- employment status distinguishes employees, employers, the self-employed, managers, and supervisors; and
- the size of the organisation is used to distinguish large and small employers, and higher and lower managers.

Since the majority of the research population is no longer in employment, occupational status refers to the last job. For the small group still in active employment, information on the current job was used, based on the assumption that they are working in a similar occupation as during their active labour market career. Respondents that are permanently disabled or sick, and homemakers are considered as a separated category (i.e. never worked or long-term unemployed).

Before assessing the occupational status, the current job situation is determined. We distinguish retired elderly (with a labour market history), elderly still in employment and

elderly who have never worked. This is based on the following questions in the SHARE module on employment and pensions:

ep005 Please look at card 20. In general, which of the following best describes your current employment situation? *(one answer)*
1. Retired
2. Employed or self-employed (including working for family business)
3. Unemployed and looking for work
4. Permanently sick or disabled
5. Homemaker
97. Other (Rentier, living off own property, student, doing voluntary work)

ep002 Did you do any paid work during the last four weeks, either as an employee or self-employed, even when this was only for a few hours?
1. Yes
5. No

ep006 Did you ever do any paid work?
1. Yes
5. No

The actual construction of occupation status is based on the instructions from the ESeC user guide and has three steps (Harrison & Rose, 2006). In the first step, employment status and organization size is determined from the following questions in the SHARE module on employment and pensions:

ep051 We are now going to talk about the last job you had. In this job, were you an employee or self-employed?
1. Employee
2. Civil servant
3. Self-employed

ep057 In this job, did you have any responsibility for supervising the work of other employees?
1. Yes
5. No

ep058 About how many people were you responsible for?
1. 1 to 5
2. 6 to 15
3. 16 to 24
4. 25 to 199
5. 200 to 499
6. 500 or more

Employment status thus differentiates:

- employers in large organisations (more than 15 employees);
- employers in small organisations (less than 15 employees);
- the self-employed without employees;
- supervisors (employees or civil servants); and
- other employees or civil servants.

Afterwards, employment status is combined with information on the job description, as asked in the following question:

ep052 What describes best this job?
1. Legislator, senior official or manager
2. Professional
3. Technician or associate professional
4. Clerk
5. Service worker and shop and market sales worker
6. Skilled agricultural or fishery worker
7. Craft and related trades worker
8. Plant and machine operator or assembler
9. Elementary occupation
10. Armed forces

The result is a categorical variable with ten categories, similar to the categories in Table A7.2. We remodelled the variable to a four-category-variable to ease the analyses (see Table A7.3). Table A7.4 gives the weighted distribution of the research population by occupational status. For 66 respondents (4%) of the weighted sample occupational status is missing.

Table A7.3. Occupational status

	ESeC Class	Occupational status
1.	Large employers, higher grade professional, administrative and managerial occupations	1. Salariat
2.	Lower grade professional, administrative and managerial occupations and higher grade technician and supervisory occupations	
3.	Intermediate occupations	2. Intermediate occupations
4.	Small employer and self-employed occupations (excluding agriculture etc.)	
5.	Self-employed occupations (agriculture etc.)	
6.	Lower supervisory and lower technician occupations	
7.	Lower services, sales and clerical occupations	3. Working class
8.	Lower technical occupations	
9.	Routine occupations	
10.	Never worked and long-term unemployed	4. Never worked and long-term unemployed

Table A7.4. Distribution of the research population by occupational status (2007, weighted)

Occupational status	N	%
Salariat	562	35
Intermediate occupations	391	24
Working class	475	29
No occupation	186	12
Total	**1616**	**100**
N missing	66	

Source: Author's calculations based on SHARE data wave 2

3. Socioeconomic status: Level of education

We include the level of education as an indicator of socioeconomic status. Higher levels of education are associated more strongly with a higher socioeconomic status, while lower levels of education correlate with a lower socioeconomic status. Level of education is based on the International Standard Classification of Education (ISCED-97), an internationally approved classification of education (UNESCO Institute for Statistics, 1997):

- pre-primary education;
- primary education;
- lower secondary education;
- upper secondary education;
- post-secondary, non-tertiary education;
- first stage of tertiary education; and
- second stage of tertiary education.

The following questions in the module on demographics were used to construct this variable:

dn010 What is the highest school leaving certificate or school degree that you have obtained, not taken account of any higher education?
1. Elementary school
2. Lower secondary school – General
3. Lower secondary school – Arts
4. Lower secondary school – Technical education
5. Lower secondary school – Professional education
6. Higher secondary school – General
7. Higher secondary school – Arts
8. Higher secondary school – Technical education
9. Higher secondary school – Professional education
95. No degree yet/still in school
96. None
97. Other type (also abroad)

dn012 Which degrees of higher education do you have?
1. Higher college education, short type
2. Higher college education, long type
3. University
4. Still in higher education or vocational training
96. None
97. Other (also abroad)

dn041 How many years have you been in full time education?
(numerical value)

This ISCED variable was further simplified into a three-category-variable: low (no or primary education), intermediate (lower secondary and upper secondary education), and high level of education (tertiary education). Table A7.5 gives the weighted distribution of the research population by their highest level of education according to the ISCED. The level of education is missing for 15 respondents in the weighted sample (1%).

Table A7.5. Distribution of the research population by level of education (weighted, 2007)

Level of education	N	%
High level	359	22
Intermediate level	770	46
Low level	537	22
Total	1667	100
N missing	15	

Source: Author's calculations based on SHARE data wave 2

4. Health status and functional level

Different strategies, varying in complexity and detail, exist to assess health status (e.g. Atella, Brunetti, & Maestas, 2012; Berkman & Gurland, 1998; Larsson, Thorslund, & Kareholt, 2006; Rogers & Saint Onge, 2007; Sprangers et al., 2000). Account can be given to both the existence and the intensity of health and functional problems, and to the objective and subjective health status. Subjective health status refers to the individual's evaluation of his/her health status, while objective health status refers to health related conditions, symptoms and diseases as diagnosed by a physician, though reported by the individual. In the SHARE, four measures of health and functional status are included (Mackenbach, Avendano, Andersen-Ranberg, & Aro, 2005):

- summary measures;
- measures of diseases and health symptoms;
- measures of limitations in functioning; and
- measures of limitations in activities of daily living.

First, the summary measures give insights in the more general health status, with questions like "Do you have any long-term health problems, illness, disability or

infirmity?" and "To what extent have you been limited in your activities due to health related problems?". Secondly, the questions on diseases and health symptoms refer to different health related problems like high blood pressure, cancer, and diabetes. Attention is also paid to other conditions like back pains, fatigue, dizziness, etc. Thirdly, measures of limitations in functioning include having difficulties with everyday activities like walking, climbing stairs and carrying weights. Lastly, the SHARE also registers problems with activities of daily living (ADL and IADL) due to health, memory or mental problems. This includes for example problems with getting dressed, washing, eating, cooking, doing administration, etc.

A first indicator of health status that we use refers to the subjective evaluation of the health status. This is based on the following question in the module on physical health:

ph003 Would you say your health is...
1. Excellent
2. Very good
3. Good
4. Fair
5. Poor

To ease the analyses, the subjective health status variable is dichotomised in that "0" indicates a fair to excellent health status, while "1" refers to a poor self-perceived health.

The second and third indicator refer to health conditions and health problems: having two or more health related problems (multimorbidity), and having multiple health related symptoms (two or more). Ideally, account should be given to the differential impact of different conditions on the health status and the quality of life, because not all conditions are associated with similar degrees of severity and disability. However, no such information is included in the SHARE.[159] The following questions from the module on physical health are used:

[159] For more information on this alternative strategy, see Sprangers et al. (2000).

ph006 Has a doctor ever told you that you had any of the conditions on this card? Please tell me the number or numbers of the conditions. *(multiple answers possible)*
1. A heart attack including myocardial infarction or coronary thrombosis or any other heart problem including congestive heart failure
2. High blood pressure or hypotension
3. High blood cholesterol
4. A stroke or cerebral vascular disease
5. Diabetes or high blood sugar
6. Chronic lung disease such as a chronic bronchitis or emphysema
7. Asthma
8. Arthritis, including osteoarthritis, or rheumatism
9. Osteoporosis
10. Cancer or malignant tumour, including leukaemia or lymphoma, but excluding minor skin cancers
11. Stomach or duodenal ulcer, peptic ulcer
12. Parkinson disease
13. Cataract
14. Hip fracture or fomoral fracture
15. Other fractures
16. Alzheimer's' disease, dementia, organic brain syndrome, senility or any other serious memory impairment
17. Benign tumour
18. None
97. Other conditions

ph010 Please look at card 9. For the past six months at least, have you been bothered by any of the health conditions on this card? Please tell me the number or numbers. *(multiple answers possible)*
1. Pain in your back, knees, hips or any other joint
2. Heart trouble or angina, chest pain during exercise
3. Breathlessness, difficulty breathing
4. Persistent cough
5. Swollen legs
6. Sleeping problems
7. Falling down
8. Fear of falling down
9. Dizziness, faints or blackouts
10. Stomach or intestine problems, including constipation, air, diarrhoea
11. Incontinence or involuntary loss of urine
12. Fatigue
96. None
97. Other symptoms, not yet mentioned

The fourth and fifth indicator refer to the having two or more limitations in resp. the ADL and IADL. The following two questions in the SHARE module on physical health are used for this, where the first six items refer to problems with ADL (from dressing to using the toilet), while the following items refer to problems with IADL (from using a map to managing money):

ph049 Please look at card 12. Here are a few more everyday activities. Please tell me if you have any difficulty with these because of a physical, mental, emotional or memory problem. Again exclude any difficulties you expect to last less than three months. *(multiple answers possible)*
1. Dressing, including putting on shoes and socks
2. Walking across a room
3. Bathing or showering
4. Eating, such as cutting up your food
5. Getting in or out of bed
6. Using the toilet, including getting up or down
7. Using a map to figure out how to get around in a strange place
8. Preparing a hot meal
9. Shopping for groceries
10. Making telephone calls
11. Taking medications
12. Doing work around the house or garden
13. Managing money, such as paying bills and keeping track of expenses

Table A7.6 gives the weighted distribution of the research population by the different indicators of health status and functional level. Information on ADL and IADL is missing for one respondent.

Table A7.6. Distribution of the research population by health status and functional level (weighted, 2007)

	N	%
Subjective health status		
Fair to excellent	1539	91
Poor	143	9
Multimorbidity		
Less than two health problems	836	50
Two or more health problems	846	50
Multi health symptoms		
Less than two health symptoms	854	51
Two or more health symptoms	828	49
Multi ADL limitations		
Less than two ADL limitations	1545	92
Two or more ADL limitations	136	8
N missing	1	
Multi IADL limitations		
Less than two IADL limitations	1474	88
Two or more IADL limitations	207	12
N missing	1	
Total	**1682**	

Source: Author's calculations based on SHARE data wave 2

APPENDIX 8. ANALYSIS OF DELETED OBSERVATIONS WITH MISSING INFORMATION

Observations are deleted from the models when there is incomplete information on the independent and the dependent variables in the models. To assess the potential bias resulting from deleting respondents with missing observations from the different models, in this appendix we compare the observations that are deleted from the model and the observations that are kept into the model. Further, we reflect on the deviation between the observations that are kept into the models and the total population.

1. Analysis of deleted observations in the models on the old age income package

In chapter 8, six regression models, testing different aspects of the old age income package, are presented:

	Type of model	Dependent variable
Model 1	Multinomial logit model	Personal income package composition
Model 2	Robust multivariate regression model	Level of personal income package
Model 3	Binomial logit model	Financial asset ownership
Model 4	Binomial logit model	Property ownership
Model 5	Robust multivariate regression model	Level of direct asset contribution
Model 6	Robust multivariate regression model	Level of simulated asset contribution

In all models, sociodemographic and socioeconomic background determinants are included as controlling (independent) variables. Respondents with missing information on one of the background variables are deleted. Further, in models 2 to 6 also income package variables are included as independent variables. Consequently, respondents with missing information on the income package variables are deleted from the models.

In the following tables, we compare the deleted observations, the observations that are kept into the models, and the total sample. The difference in percentage points between the observations in the model and the complete population is shown in the last column (Δ).

The differences between the respondents in the models and the overall sample are relatively small. However, we do see that women are overrepresented in the group of respondents with missing information. This is explained by the fact that women are overrepresented among the respondents with missing information on their occupational status. The same holds for the respondents aged 75 years and over. This group is also overrepresented among the deleted observations, because they are overrepresented among the respondents with missing information on their occupational status. Lastly, we

also see a slightly stronger prevalence of respondents with only a third pillar pension or without personal income sources in the group of deleted respondents. Again, this is related to the overrepresentation of women in the group of deleted respondents: women significantly have more access to this type of personal income packages (only P3 or no personal income) (cf. supra).

Table A8.1 Deleted observations in model 1 with the personal income package composition as the dependent variable

	Deleted observations		Observations in the model		Total sample		
	N	%	N	%	N	%	Δ
Sex							
Male	23	27	676	42	699	41	-1
Female	62	73	931	58	993	59	1
Age							
60-74	36	42	1006	63	1042	62	-1
75+	49	58	601	37	650	38	1
Occupational status							
Salariat	6	7	537	33	543	32	-1
Intermediate	5	6	392	24	397	23	-1
Working class	3	4	479	30	482	28	-1
No occupation	1	1	199	12	200	12	-1
Missing	70	82	0	0	70	4	4
Level of education							
High	8	9	338	21	346	20	-1
Intermediate	41	48	735	46	776	46	0
Low	20	24	534	33	554	33	0
Missing	16	19	0	0	16	1	1
Living situation							
Couple	44	52	1036	64	1080	64	-1
Single	41	48	571	36	612	36	1
Region of residence							
Flanders	28	33	1040	65	1068	63	-2
Wallonia	44	52	514	32	558	33	1
Brussels	13	15	53	3	66	4	1
Personal income package							
P1	27	32	542	34	569	34	0
P2+P1	7	8	142	9	149	9	0
P1+P3	17	20	460	29	477	28	0
SS+other	5	6	111	7	116	7	0
Wage+other	1	1	84	5	85	5	0
Only P3	3	4	104	6	107	6	0
None	19	22	164	10	183	11	1
Missing	6	7	0	0	6	0	0
Total	**85**	**100**	**1607**	**100**	**1692**	**100**	

Note: "Δ" indicates the difference in percentage points between the population in the model and the overall population.

Source: Author's calculations based on SHARE data wave 2

Table A8.2 Deleted observations in model 2 with the level of the personal income package as the dependent variable

	Deleted observations		Observations in the model		Total sample		
	N	%	N	%	N	%	Δ
Sex							
Male	43	33	656	42	699	41	-1
Female	87	67	906	58	993	59	1
Age							
60-74	59	45	983	63	1042	62	-1
75+	71	55	579	37	650	38	1
Occupational status							
Salariat	21	16	522	33	543	32	-1
Intermediate	15	12	382	24	397	23	-1
Working class	17	13	465	30	482	28	-1
No occupation	7	5	193	12	200	12	-1
Missing	70	54	0	0	70	4	4
Level of education							
High	16	12	330	21	346	20	-1
Intermediate	60	46	716	46	776	46	0
Low	38	29	516	33	554	33	0
Missing	16	12	0	0	16	1	1
Living situation							
Couple	76	58	1004	64	1080	64	0
Single	54	42	558	36	612	36	0
Region of residence							
Flanders	65	50	1003	64	1068	63	-1
Wallonia	52	40	506	32	558	33	1
Brussels	13	10	53	3	66	4	1
Personal income package							
P1	48	37	521	33	569	34	0
P2+P1	9	7	140	9	149	9	0
P1+P3	30	23	447	29	477	28	0
SS+other	8	6	108	7	116	7	0
Wage+other	5	4	80	5	85	5	0
Only P3	3	2	104	7	107	6	0
None	21	16	162	10	183	11	0
Missing	6	5	0	0	6	0	0
Level of personal income							
Not missing	52	40	1562	100	1640	97	3
Missing	78	60	0	0	78	3	-3
Total	**130**	**100**	**1562**	**100**	**1692**	**100**	

Note: "Δ" indicates the difference in percentage points between the population in the model and the overall population.

Source: Author's calculations based on SHARE data wave 2

Table A8.3 Deleted observations in model 3 with financial asset ownership as the dependent variable

	Deleted observations		Observations in the model		Total sample		
	N	%	N	%	N	%	Δ
Sex							
Male	56	35	643	42	699	41	-1
Female	106	65	887	58	993	59	1
Age							
60-74	76	47	966	63	1042	62	-2
75+	86	53	564	37	650	38	2
Occupational status							
Salariat	29	18	514	34	543	32	-2
Intermediate	25	15	372	24	397	23	-1
Working class	27	17	455	30	482	28	-1
No occupation	11	7	189	12	200	12	-1
Missing	70	43	0	0	70	4	4
Level of education							
High	20	12	326	21	346	20	-1
Intermediate	75	46	701	46	776	46	0
Low	51	31	503	33	554	33	0
Missing	16	10	0	0	16	1	1
Living situation							
Couple	98	60	982	64	1080	64	0
Single	64	40	548	36	612	36	0
Region of residence							
Flanders	87	54	981	64	1068	63	-1
Wallonia	62	38	496	32	558	33	1
Brussels	13	8	53	3	66	4	0
Personal income package							
P1	60	37	509	33	569	34	0
P2+P1	10	6	139	9	149	9	0
P1+P3	38	23	439	29	477	28	-1
SS+other	10	6	106	7	116	7	0
Wage+other	7	4	78	5	85	5	0
Only P3	5	3	102	7	107	6	0
None	26	16	157	10	183	11	1
Missing	6	4	0	0	6	0	0
Level of personal income							
Not missing	110	68	1530	100	1640	97	3
Missing	52	32	0	0	52	3	-3
Financial asset ownership							
No	5	3	46	3	51	3	0
Yes	119	73	1484	97	1603	95	-2
Missing	38	23	0	0	38	2	2
Total	**162**	**100**	**1530**	**100**	**1692**	**100**	

Note: "Δ" indicates the difference in percentage points between the population in the model and the overall population.

Source: Author's calculations based on SHARE data wave 2

Table A8.4 Deleted observations in model 4 with property asset ownership as the dependent variable

	Deleted observations		Observations in the model		Total sample		
	N	%	N	%	N	%	Δ
Sex							
Male	56	35	643	42	699	41	-1
Female	106	65	887	58	993	59	1
Age							
60-74	76	47	966	63	1042	62	-2
75+	86	53	564	37	650	38	2
Occupational status							
Salariat	29	18	514	34	543	32	-2
Intermediate	25	15	372	24	397	23	-1
Working class	27	17	455	30	482	28	-1
No occupation	11	7	189	12	200	12	-1
Missing	70	43	0	0	70	4	4
Level of education							
High	20	12	326	21	346	20	-1
Intermediate	75	46	701	46	776	46	0
Low	51	31	503	33	554	33	0
Missing	16	10	0	0	16	1	1
Living situation							
Couple	98	60	982	64	1080	64	0
Single	64	40	548	36	612	36	0
Region of residence							
Flanders	87	54	981	64	1068	63	-1
Wallonia	62	38	496	32	558	33	1
Brussels	13	8	53	3	66	4	0
Personal income package							
P1	60	37	509	33	569	34	0
P2+P1	10	6	139	9	149	9	0
P1+P3	38	23	439	29	477	28	-1
SS+other	10	6	106	7	116	7	0
Wage+other	7	4	78	5	85	5	0
Only P3	5	3	102	7	107	6	0
None	26	16	157	10	183	11	1
Missing	6	4	0	0	6	0	0
Level of personal income							
Not missing	110	68	1530	100	1640	97	3
Missing	52	32	0	0	52	3	-3
Property asset ownership							
No	29	18	284	19	313	18	0
Yes	95	59	1246	81	1341	79	-2
Missing	38	23	0	0	38	2	2
Total	**162**	**100**	**1530**	**100**	**1692**	**100**	

Note: "Δ" indicates the difference in percentage points between the population in the model and the overall population.

Source: Author's calculations based on SHARE data wave 2

Table A8.5 Deleted observations in model 5 with level of the direct asset contribution as the dependent variable

	Deleted observations		Observations in the model		Total sample		
	N	%	N	%	N	%	Δ
Sex							
Male	82	35	617	42	699	41	-1
Female	154	65	839	58	993	59	1
Age							
60-74	102	43	940	65	1042	62	-3
75+	134	57	516	35	650	38	3
Occupational status							
Salariat	46	19	497	34	543	32	-2
Intermediate	40	17	357	25	397	23	-1
Working class	62	26	420	29	482	28	0
No occupation	18	8	182	13	200	12	-1
Missing	70	30	0	0	70	4	4
Level of education							
High	29	12	317	22	346	20	-1
Intermediate	106	45	670	46	776	46	0
Low	85	36	469	32	554	33	1
Missing	16	7	0	0	16	1	1
Living situation							
Couple	116	49	964	66	1080	64	-2
Single	120	51	492	34	612	36	2
Region of residence							
Flanders	126	53	942	65	1068	63	-2
Wallonia	94	40	464	32	558	33	1
Brussels	16	7	50	3	66	4	0
Personal income package							
P1	105	44	464	32	569	34	2
P2+P1	13	6	136	9	149	9	-1
P1+P3	46	19	431	30	477	28	-1
SS+other	19	8	97	7	116	7	0
Wage+other	12	5	73	5	85	5	0
Only P3	6	3	101	7	107	6	-1
None	29	12	154	11	183	11	0
Missing	6	3	0	0	6	0	0
Level of personal income							
Not missing	184	78	1456	100	1640	97	-3
Missing	52	22	0	0	52	3	3
Level of direct contribution							
Not missing	116	49	1456	100	1572	93	-7
Missing (no ownership)*	87	37	0	0	87	5	5
Missing (with ownership)	33	14	0	0	33	2	2
Total	**236**	**100**	**1456**	**100**	**1692**	**100**	

* Respondents without financial asset ownership and without secondary residence ownership do not have direct revenues from assets. Consequently, they have a missing value from this variable.

Note: "Δ" indicates the difference in percentage points between the population in the model and the overall population.

Source: Author's calculations based on SHARE data wave 2

Table A8.6 Deleted observations in model 6 with level of the simulated asset contribution as the dependent variable

	Deleted observations		Observations in the model		Total sample		
	N	%	N	%	N	%	Δ
Sex							
Male	63	34	636	42	699	41	-1
Female	121	66	872	58	993	59	1
Age							
60-74	89	48	953	63	1042	62	-2
75+	95	52	555	37	650	38	2
Occupational status							
Salariat	31	17	512	34	543	32	-2
Intermediate	33	18	364	24	397	23	-1
Working class	38	21	444	29	482	28	-1
No occupation	12	7	188	12	200	12	-1
Missing	70	38	0	0	70	4	4
Level of education							
High	21	11	325	22	346	20	-1
Intermediate	86	47	690	46	776	46	0
Low	61	33	493	33	554	33	0
Missing	16	9	0	0	16	1	1
Living situation							
Couple	102	55	978	65	1080	64	-1
Single	82	45	530	35	612	36	1
Region of residence							
Flanders	101	55	967	64	1068	63	-1
Wallonia	70	38	488	32	558	33	1
Brussels	13	7	53	4	66	4	0
Personal income package							
P1	69	38	500	33	569	34	0
P2+P1	10	5	139	9	149	9	0
P1+P3	39	21	438	29	477	28	-1
SS+other	16	9	100	7	116	7	0
Wage+other	10	5	75	5	85	5	0
Only P3	5	3	102	7	107	6	0
None	29	16	154	10	183	11	1
Missing	6	3	0	0	6	0	0
Level of personal income							
Not missing	132	72	1508	100	1640	97	
Missing	52	28	0	0	52	3	
Level of simulated contribution							
Not missing	122	66	1508	100	1630	96	
Missing	62	34	0	0	62	4	
Total	**184**	**100**	**1508**	**100**	**1692**	**100**	

Note: "Δ" indicates the difference in percentage points between the population in the model and the overall population.

Source: Author's calculations based on SHARE data wave 2

2. Analysis of deleted observations in the models on the old age health and social care package

In chapter 10, different models testing diverse aspects of the old age health and social care package are presented:

	Type of model	Dependent variable
Model 7-8	Multinomial logit model	Care package
Model 9-10	Binomial logit model	Second-line health care
Model 11-12	Multinomial logit model	Type of social care
Model 13-14	Multinomial logit model	Intensity health care contacts
Model 15-16	Robust multivariate regression model	Intensity formal social care

In all models, sociodemographic and socioeconomic background determinants are included as controlling (independent) variables. Respondents with missing information on one of the background variables are deleted. In addition, respondents with missing information on one of the income variables are deleted. Lastly, respondents are also deleted when we do not have information on the use of health and social care services.

In the following table, we compare the deleted observations, the observations that are kept into the models, and the total sample. The difference in percentage points (Δ) between the observations in the model and the complete sample is shown in the last column.

Again we see an overrepresentation of women and the oldest old among the deleted respondents (cf. supra), which stems from the overrepresentation of both groups among the observations without information on their occupational status. In addition, elderly with more complex care packages show to be slightly overrepresented among the deleted observations. For example, 12% of the deleted respondents has a mixed care package, compared to 9% of the observations in the model.

Table A8.7 Deleted observations in the models with health and social care services as the dependent variables

	Deleted observations		Observations in the model		Total sample		
	N	%	N	%	N	%	Δ
Sex							
Male	70	35	629	42	699	41	-1
Female	130	65	863	58	993	59	1
Age							
60-74	86	43	956	64	1042	62	-2
75+	114	57	536	36	650	38	2
Occupational status							
Salariat	46	23	497	33	543	32	-1
Intermediate	32	16	365	24	397	23	-1
Working class	38	19	444	30	482	28	-1
No occupation	14	7	186	12	200	12	-1
Missing	70	35	0	0	70	4	4
Level of education							
High	28	14	318	21	346	20	-1
Intermediate	91	46	685	46	776	46	0
Low	65	33	489	33	554	33	0
Missing	16	8	0	0	16	1	1
Living situation							
Couple	105	53	975	65	1080	64	-2
Single	95	48	517	35	612	36	2
Region of residence							
Flanders	109	55	959	64	1068	63	-1
Wallonia	75	38	483	32	558	33	1
Brussels	16	8	50	3	66	4	1
Personal income package							
P1	82	41	487	33	569	34	1
P2+P1	12	6	137	9	149	9	0
P1+P3	43	22	434	29	477	28	-1
SS+other	16	8	100	7	116	7	0
Wage+other	9	5	76	5	85	5	0
Only P3	6	3	101	7	107	6	0
None	26	13	157	11	183	11	0
Missing	6	3	0	0	6	0	0
Financial asset ownership							
No financial assets	10	5	41	3	51	3	0
Financial assets	152	76	1451	97	1603	95	-3
Missing	38	19	0	0	38	2	2
Home ownership							
No home ownership	36	18	298	20	334	20	0
Home ownershipt	126	63	1194	80	1320	78	-2
Missing	38	19	0	0	38	2	2
Secondary residence							
No secondary residence	136	68	1237	83	1373	81	-2
Secondary residence	26	13	255	17	281	17	0
Missing	38	19	0	0	38	2	2
Level of personal income							
Not missing	52	26	0	0	52	3	3
Missing	148	74	1492	100	1640	97	-3

Table A8.7 Deleted observations in the models with health and social care services as the dependent variables (continued)

	Deleted observations		Observations in the model		Total sample		
	N	%	N	%	N	%	Δ
Level of extended income							
Not missing	118	59	0	0	118	7	7
Missing	82	41	1492	100	1574	93	-7
Subjective health							
Bad	175	88	1373	92	1548	91	-1
Fair to good	25	13	119	8	144	9	1
Multimorbidity							
Less than 2	89	45	737	49	826	49	-1
More than 2	111	56	755	51	866	51	1
Multisymptoms							
Less than 2	83	42	765	51	848	50	-1
More than 2	117	59	727	49	844	50	1
Multi ADL limitations							
Less than 2	166	83	1385	93	1551	92	-1
More than 2	33	17	107	7	140	8	1
Missing	1	1	0	0	1	0	0
Multi IADL limitations							
Less than 2	150	75	1322	89	1472	87	-2
More than 2	49	25	170	11	219	13	2
Missing	1	1	0	0	1	0	0
Care package							
Minor care package	38	19	440	29	478	28	-1
Second-line health care	30	15	346	23	376	22	-1
Hospital care	17	9	183	12	200	12	0
Informal home help	29	15	205	14	234	14	0
Formal home help	25	13	126	8	151	9	0
Informal personal care	5	3	64	4	69	4	0
Mixed care package	23	12	128	9	151	9	0
Missing	33	17	0	0	33	2	2

Note: "Δ" indicates the difference in percentage points between the population in the model and the overall population.

Source: Author's calculations based on SHARE data wave 2

APPENDIX 9. THE QUALITY OF THE CARE PACKAGE BY A NUMBER OF BACKGROUND CHARACTERISTICS

In this appendix, we illustrate the quality of the care package by the main sociodemographic and socioeconomic background characteristics included in our research (i.e. sex, age, occupational status, level of education, living situation and region of residence). Tables A9.1 and A9.2 focus on the quality of the health care services, while Tables A9.3, A9.4 and A9.5 focus on the quality of the social care services received.

Table A9.1. Relative distribution of the research population by the ratio of successful specialist contacts by sex, age, occupational status, level of education, living situation and region of residence (weighted, 2007)

%	Never	Sometimes	Most of the time	Always	Mean	Total (100%)
Sex						
Male	30	5	21	43	0.56	331
Female	30	15	31	25	0.47	454
Age						
60-74	36	8	23	32	0.48	489
75+	20	15	32	33	0.56	296
Occupational status						
Salariat	32	8	21	39	0.53	284
Intermediate	32	10	25	33	0.51	181
Working class	28	14	30	28	0.49	199
None	28	12	34	27	0.49	89
Level of education						
High	28	9	24	39	0.55	182
Intermediate	34	9	26	30	0.48	366
Low	25	14	30	31	0.53	227
Living situation						
Couple	33	7	23	37	0.52	492
Single	25	17	32	26	0.49	293
Region of residence						
Flanders	34	10	22	34	0.50	442
Wallonia	25	11	34	30	0.53	306
Brussels	25	15	27	34	0.54	37
Total	**30**	**11**	**27**	**33**	**0.51**	**786**

Source: Author's calculations based on SHARE data wave 2

Table A9.2. Relative distribution of the research population by the ratio of successful medication by sex, age, occupational status, level of education, living situation and region of residence (weighted, 2007)

%	Never	Sometimes	Most of the time	Always	Mean	Total (100%)
Sex						
Male	15	3	25	57	0.73	467
Female	14	4	30	52	0.71	632
Age						
60-74	15	4	25	56	0.72	673
75+	13	3	32	51	0.72	425
Occupational status						
Salariat	16	3	27	54	0.71	352
Intermediate	11	2	29	58	0.75	263
Working class	16	5	28	52	0.70	312
None	14	4	28	54	0.71	123
Level of education						
High	15	5	26	54	0.71	225
Intermediate	15	3	27	55	0.72	503
Low	13	4	31	52	0.71	360
Living situation						
Couple	14	3	26	58	0.73	697
Single	15	5	32	48	0.69	402
Region of residence						
Flanders	16	2	25	57	0.72	617
Wallonia	12	5	34	49	0.71	441
Brussels	19	5	21	55	0.69	39
Total	14	4	28	54	0.72	1099

Source: Author's calculations based on SHARE data wave 2

Table A9.3. Relative distribution of the research population by the receipt of appropriate social care by type of care and by sex, age, occupational status, level of education, living situation and region of residence (weighted, 2007)

	Personal care			Home help		
%	Success	No success	Total (N=100%)	Success	No success	Total (N=100%)
Sex						
Male	36	64	96	52	48	128
Female	37	63	182	72	28	245
Age						
60-74	26	74	121	52	48	153
75+	45	55	157	74	26	221
Occupational status						
Salariat	37	63	68	48	52	98
Intermediate	30	70	64	74	26	74
Working class	39	61	88	70	30	124
None	39	61	42	66	34	57
Level of education						
High	45	55	39	48	52	62
Intermediate	33	67	112	62	38	142
Low	37	63	120	74	26	163
Living situation						
Couple	36	64	143	47	53	177
Single	38	62	135	82	18	196
Region of residence						
Flanders	42	58	135	68	32	186
Wallonia	32	68	135	62	38	176
Brussels	39	61	8	77	23	11
Total	**37**	**63**	**278**	**65**	**35**	**373**

Note: Only elderly with limitations in ADL, resp. IADL are included here.

Source: Author's calculations based on SHARE data wave 2

Table A9.4. Relative distribution of the research population by the preferential care provider by sex, age, occupational status, level of education, living situation and region of residence (weighted, 2007)

	Personal care			Home help		
%	Success	No success	Total (N=100%)	Success	No success	Total (N=100%)
Sex						
Male	59	41	50	62	38	49
Female	71	29	87	66	34	85
Age						
60-74	66	34	62	63	37	63
75+	66	34	75	67	33	71
Occupational status						
Salariat	67	33	44	68	32	31
Intermediate	68	32	32	62	38	39
Working class	61	39	34	57	43	46
None	69	31	22	75	25	14
Level of education						
High	63	37	26	62	38	25
Intermediate	61	39	59	67	33	56
Low	74	26	51	63	37	53
Living situation						
Couple	58	42	76	60	40	63
Single	76	24	61	68	32	71
Region of residence						
Flanders	68	32	77	68	32	80
Wallonia	64	36	58	58	42	52
Brussels	68	32	3	80	20	3
Total	**66**	**34**	**137**	**65**	**35**	**134**

Note: Only elderly with limitations in ADL, resp. IADL, that received the indicated type of care are included here.

Source: Author's calculations based on SHARE data wave 2

Table A9.5. Relative distribution of the research population by the patient satisfaction with the social care services received by sex, age, occupational status, level of education, living situation and region of residence (weighted, 2007)

%	Never	Sometimes	Most of the time	Always	Total (N=100%)
Sex					
Male	1	9	32	58	125
Female	1	5	32	62	249
Age					
60-74	0	9	32	59	142
75+	2	6	32	61	231
Occupational status					
Salariat	1	6	25	69	93
Intermediate	1	11	30	58	83
Working class	2	5	40	54	117
None	0	7	23	71	59
Level of education					
High	2	7	24	66	54
Intermediate	1	7	33	59	148
Low	1	6	33	59	164
Living situation					
Couple	1	9	25	66	181
Single	2	5	38	55	192
Region of residence					
Flanders	0	6	22	71	192
Wallonia	2	8	41	49	172
Brussels	0	0	63	37	9
Total	**1**	**7**	**32**	**60**	**373**

Source: Author's calculations based on SHARE data wave 2

APPENDIX 10. DETAILED LOGIT MODELS EXPLAINING THE USE OF HEALTH AND SOCIAL CARE SERVICES

This appendix includes the detailed results of the logit models explaining different aspects of the use of health and social care services. The results of these models are discussed in chapter 10:

Model	Dependent Variable	Independent variables	Table
LM1A	Care package	Personal income package	Table A10.1
		Personal income package + controlling variables	Table A10.2
LM1B	Care package	Extended income package	Table A10.3
		Extended income package + controlling variables	Table A10.4
LM2A	Second-line health care	Personal income package	Table A10.5
		Personal income package + controlling variables	Table A10.5
LM2B	Second-line health care	Extended income package	Table A10.6
		Extended income package + controlling variables	Table A10.6
LM3A	Formal social care	Personal income package	Table A10.7
		Personal income package + controlling variables	Table A10.7
LM3B	Formal social care	Extended income package	Table A10.8
		Extended income package + controlling variables	Table A10.8
LM4A	Intensity health care use	Personal income package	Table A10.9
		Personal income package + controlling variables	Table A10.9
LM4B	Intensity health care use	Extended income package	Table A10.10
		Extended income package + controlling variables	Table A10.10
LM5A	Intensity social care use	Personal income package	Table A10.11
		Personal income package + controlling variables	Table A10.11
LM5B	Intensity social care use	Extended income package	Table A10.12
		Extended income package + controlling variables	Table A10.12

Table A10.1 Results of the multinomial logit model with composition of the care package as dependent variable and the personal income package as the main independent variable (weighted, 2007)

LM1A (only income)	Second-line health care		Hospital care		Informal home help		Formal home help		Informal personal care		Mixed care package	
	OR	***p***	**OR**	***p***	**OR**	***p***	**OR**	***p***	**OR**	***p***	**OR**	***p***
Personal income package (reference: P1)												
P2+P1	1.2651	0.3756	1.2300	0.5309	0.8412	0.5830	0.3010	0.0155	0.4080	0.1438	0.6033	0.2130
P1+P3	1.1252	0.5444	1.2603	0.3335	0.9650	0.8675	0.6758	0.1291	0.5441	0.0914	0.6151	0.0733
SS+other	0.8570	0.6263	1.6231	0.1518	1.0482	0.8835	0.6057	0.2375	0.6870	0.4900	0.9617	0.9170
Wage+other	0.7157	0.2803	0.8674	0.7090	0.2029	0.0029	0.2417	0.0143	0.1767	0.0646	0.2848	0.0355
Only P3	1.1824	0.5539	0.5539	0.1773	0.2901	0.0046	0.3752	0.0329	0.6728	0.4650	0.3304	0.0236
None	0.9124	0.7396	1.4650	0.2148	0.2202	0.0003	0.3468	0.0126	1.0845	0.8514	0.5906	0.1433
Personal income level (reference: <760)												
760-999	0.8988	0.6480	0.8118	0.4666	0.7873	0.3802	0.9908	0.8981	2.0620	0.0948	1.0933	0.7541
1000-1189	1.0966	0.7199	1.2959	0.3820	0.8095	0.4785	1.1710	0.6523	1.2153	0.7188	1.0877	0.7937
1190-1571	1.3445	0.2278	1.1907	0.5604	0.9742	0.7845	0.7149	0.3671	2.4466	0.0582	1.0326	0.8284
>1572	1.8090	0.0133	1.2434	0.4588	0.6654	0.1725	1.0827	0.8139	1.7733	0.2662	0.4766	0.0833

Note: The reference category of the dependent variable is having a minor care package. The global effect of the personal income package composition and the income level is statistically significant at an alpha-level of 0.05 (for income package composition: Wald Chi^2=40.3694; p=0.0219; for income level: Wald Chi^2=74.4486; p=0.0002).

Source: Author's calculations based on SHARE data wave 2

Table A10.2 Results of the multinomial logit model with composition of the care package as dependent variable and the personal income package and the background variables as the independent variables (weighted, 2007)

LM1A (complete)	Second-line health care		Hospital care		Informal home help		Formal home help		Informal personal care		Mixed care package	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*	OR	*P*	OR	*p*
Personal income package (reference: P1)												
P2+P1	1.2386	0.4500	1.2358	0.5531	1.4077	0.3281	0.6141	0.3767	0.6560	0.5280	1.2238	0.6601
P1+P3	1.0876	0.6856	1.3487	0.2463	1.4278	0.1381	1.3970	0.2706	0.8672	0.7259	1.0528	0.8715
SS+other	0.9112	0.7900	1.4902	0.2788	1.5177	0.2483	1.8187	0.2300	0.7652	0.6677	1.6194	0.2894
Wage+other	0.7803	0.4445	0.9322	0.8634	0.3459	0.0594	0.7577	0.6751	0.3733	0.3153	0.7822	0.7063
Only P3	1.2449	0.4726	0.6122	0.2954	0.6341	0.3343	1.4750	0.4628	1.0393	0.9516	1.0698	0.9041
None	0.8584	0.6155	1.7236	0.1273	0.3996	0.0467	1.1094	0.8371	1.4562	0.4973	1.4535	0.4079
Personal income level (reference: <760)												
760-999	0.8731	0.5750	0.5924	0.0858	0.5851	0.0724	0.8698	0.7032	1.2320	0.6635	0.8562	0.6647
1000-1189	0.9593	0.8760	0.9686	0.9087	0.6365	0.1633	1.0541	0.8785	0.8259	0.7458	0.8536	0.6921
1190-1571	1.2201	0.4359	0.9985	0.8482	0.9940	0.8191	0.9247	0.8498	1.9686	0.1864	1.1990	0.6483
>1572	1.5400	0.0923	1.1553	0.6510	1.0166	0.8975	2.1483	0.0683	2.0077	0.2198	0.7534	0.5554
Subjective health (reference: poor)												
Fair to good	0.9269	0.8835	0.1880	0.0003	0.4720	0.1305	0.3784	0.0677	0.1440	0.0002	0.3143	0.0213
Multimorbidity (reference: two or more health related problems)												
Less than two	0.7090	0.0349	0.4210	<0.0001	0.5159	0.0010	0.3248	<0.0001	0.5449	0.0619	0.4477	0.0023
Multisymptoms (reference: two or more health related symptoms)												
Less than two	0.5525	0.0005	0.4260	<0.0001	0.3864	<0.0001	0.4822	0.0071	0.2178	<0.0001	0.3433	0.0001
Multi ADL limitations (reference: two or more ADL limitations)												
Less than two	0.6612	0.5339	1.8528	0.4880	0.5355	0.3306	0.2412	0.0262	0.1774	0.0115	0.0933	<0.0001
Multi IADL (reference: two or more IADL limitations)												
Less than two	0.8015	0.6702	0.6283	0.3880	0.2871	0.0071	0.1549	0.0001	0.1535	0.0007	0.2179	0.0016
Sex (reference: female)												
Male	0.7802	0.1473	1.5059	0.0574	0.9383	0.7637	0.6642	0.1490	1.6084	0.1718	0.8773	0.6359
Age (reference: 75+)												
60-74	1.1522	0.4463	1.0049	0.9816	0.6649	0.0535	0.1945	<0.0001	0.6054	0.1335	0.4701	0.0037

Table A10.2 Results of the multinomial logit model with composition of the care package as dependent variable and the personal income package and the background variables as the independent variables (weighted, 2007) (continued)

LM1A (complete)	Second-line health care		Hospital care		Informal home help		Formal home help		Informal personal care		Mixed care package	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*	OR	*P*	OR	*p*
Occupational status (reference: no occupation)												
Salariat	1.6186	0.1257	0.9955	0.9888	0.8764	0.7310	1.0620	0.8957	1.0633	0.9216	1.9533	0.1330
Intermediate	1.3810	0.2818	0.8601	0.6877	1.0883	0.8120	2.0652	0.0719	1.3547	0.5975	1.0816	0.8542
- Working class	0.8479	0.5785	0.9864	0.9699	1.1174	0.7452	1.0567	0.8934	0.9794	0.9701	0.8761	0.7440
Level of education (reference: low)												
High	0.9803	0.9385	1.3497	0.3521	0.8212	0.5535	1.5743	0.2844	0.8173	0.7080	0.5453	0.1397
Intermediate	1.0443	0.8216	1.3621	0.1860	1.1102	0.6391	1.9663	0.0190	0.8943	0.7516	0.8324	0.5101
Living situation (reference: single)												
Couple	0.9687	0.8649	0.8146	0.3638	0.3101	<0.0001	0.3230	<0.0001	2.3665	0.0437	0.3935	0.0006
Region (reference: Brussels)												
Flanders	0.3177	0.0108	0.4923	0.1922	0.7800	0.6709	2.6047	0.3020	50926	0.9685	0.8673	0.8443
Wallonia	0.3688	0.0289	0.3599	0.0666	0.7196	0.5790	2.1229	0.4204	42533	0.9690	0.8483	0.8224

Note: The reference category of the dependent variable is having a minor care package. The global effect of the personal income package composition and the income level is not significant at the 0.05-level (for income package composition: Wald Chi^2=25.7231; p=0.3707; for income level: Wald Chi^2=36.5080; p=0.4455).

Source: Author's calculations based on SHARE data wave 2

Table A10.3 Results of the multinomial logit model with composition of the care package as dependent variable and the extended income package as the main independent variable (weighted, 2007)

LM1B (only income)	Second-line health care		Hospital care		Informal home help		Formal home help		Informal personal care		Mixed care package	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Personal income package (reference: P1)												
P2+P1	1.1993	0.4997	1.2225	0.5487	0.8655	0.6515	0.3133	0.0203	0.4809	0.2378	0.6897	0.3671
P1+P3	1.1068	0.6057	1.2466	0.3624	0.9941	0.9744	0.6745	0.1304	0.6393	0.2218	0.6427	0.1075
SS+other	0.8418	0.5892	1.6114	0.1610	1.0236	0.9426	0.6083	0.2436	0.7582	0.6149	0.9672	0.9296
Wage+other	0.7100	0.2725	0.7989	0.5601	0.1986	0.0027	0.2389	0.0140	0.1716	0.0631	0.3024	0.0466
Only P3	1.1725	0.5758	0.5807	0.2148	0.3264	0.0103	0.4266	0.0641	0.8031	0.6881	0.3982	0.0609
None	0.9420	0.8282	1.6275	0.1131	0.2483	0.0010	0.4080	0.0347	1.2251	0.6409	0.6903	0.3074
Financial asset ownership (reference: ownership)												
None	1.3372	0.6011	2.2117	0.1614	1.9884	0.1954	0.8198	0.8089	6.4376	0.0011	1.3282	0.6640
Home ownership (reference: ownership)												
None	0.9127	0.6508	0.9738	0.9108	1.4210	0.1000	1.1277	0.6514	1.4328	0.2687	1.8986	0.0072
Secondary residence ownership (reference: ownership)												
None	0.9957	0.9801	1.0487	0.8360	1.0302	0.9013	1.3436	0.3383	1.7693	0.2117	1.3497	0.3525
Total direct income level (reference: <837)												
837-1066	1.0319	0.8250	1.1096	0.7261	0.9296	0.7910	1.2915	0.4525	1.7202	0.2053	1.4653	0.2608
1067-1092	1.2436	0.3791	1.4662	0.1861	1.0485	0.8250	1.3372	0.4055	1.8125	0.1773	1.0005	0.7591
1093-1759	2.0943	0.0025	1.2998	0.3974	0.9711	0.8806	1.1531	0.7004	1.9170	0.1696	1.3613	0.3664
>1760	2.0056	0.0050	1.9391	0.0282	1.0069	0.8728	1.5902	0.2020	1.9194	0.1979	0.7078	0.4165

Note: The reference category of the dependent variable is having a minor care package. The global effect of the personal income package composition. financial asset ownership and the income level from the extended income package is significant at the 0.05-level (for income package composition: Wald Chi^2=66.4817; p=0.0015; for financial asset ownership: Wald Chi^2=13.5570; p=0.0350; for income level: Wald Chi^2=38.3135; p=0.0345). The global effect of home ownership and secondary residence ownership is not significant at the 0.05-level (for home ownership: Wald Chi^2=12.2203; p=0.0573; for secondary residence ownership: Wald Chi^2=3.1679; p=0.7872).

Source: Author's calculations based on SHARE data wave 2

Table A10.4 Results of the multinomial logit model with composition of the care package as dependent variable and the extended income package and the background variables as the main independent variables (weighted, 2007)

LM1B (complete)	Second-line health care		Hospital care		Informal home help		Formal home help		Informal personal care		Mixed care package	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Personal income package (reference: P1)												
P2+P1	1.1870	0.5475	1.1958	0.6188	1.2772	0.4881	0.5473	0.2795	0.6854	0.5719	1.1622	0.7454
P1+P3	1.0786	0.7177	1.3417	0.2578	1.3970	0.1674	1.3748	0.2973	0.9020	0.8013	1.0103	0.9621
SS+other	0.9337	0.8382	1.4990	0.2752	1.4778	0.2813	1.8024	0.2403	0.7422	0.6449	1.6142	0.2941
Wage+other	0.8215	0.5465	0.9010	0.8016	0.3323	0.0523	0.7743	0.7025	0.3724	0.3189	0.8228	0.7654
Only P3	1.2877	0.4056	0.6462	0.3483	0.6551	0.3665	1.5024	0.4430	1.2709	0.7025	1.1017	0.8617
None	0.9185	0.7790	1.9570	0.0584	0.4428	0.0751	1.2780	0.6270	1.7630	0.3076	1.5700	0.3184
Financial asset ownership (reference: ownership)												
None	1.4120	0.5452	1.8863	0.3001	1.2244	0.7223	0.4230	0.3328	5.9993	0.0068	0.8340	0.8055
Home ownership (reference: ownership)												
None	0.7055	0.1091	0.7361	0.2365	0.8333	0.4435	0.6225	0.1161	1.0992	0.7977	1.0005	0.9847
Secondary residence ownership (reference: ownership)												
None	1.0567	0.7763	0.9073	0.6868	0.7563	0.2748	0.8875	0.7249	1.1940	0.7176	0.8000	0.5253
Total direct income level (reference: <837)												
837-1066	1.0012	0.8309	0.9864	0.8903	0.7412	0.3112	1.1897	0.6562	1.6600	0.2880	1.2362	0.5753
1067-1092	1.1350	0.6205	1.2940	0.3970	0.9959	0.7842	1.5815	0.2522	1.7660	0.2514	1.0512	0.7712
1093-1759	1.8800	0.0135	1.1995	0.5788	1.1513	0.6549	1.6979	0.2113	2.4036	0.0916	1.8350	0.1255
>1760	1.6900	0.0494	1.8026	0.0772	1.4617	0.2731	2.8857	0.0135	2.4505	0.1216	1.0607	0.8371
Subjective health (reference: poor)												
Fair to good	0.9836	0.9744	0.2132	0.0007	0.5198	0.1855	0.3851	0.0708	0.1604	0.0005	0.3260	0.0253
Multimorbidity (reference: two or more health related problems)												
Less than two	0.7145	0.0398	0.4162	<0.0001	0.5221	0.0012	0.3304	<0.0001	0.5545	0.0724	0.4509	0.0022
Multisymptoms (reference: two or more health related symptoms)												
Less than two	0.5523	0.0005	0.4269	<0.0001	0.3838	<0.0001	0.4884	0.0086	0.2139	<0.0001	0.3431	00.0001
Multi ADL limitations (reference: two or more ADL limitations)												
Less than two	0.6372	0.4961	1.8336	0.4949	0.5489	0.3461	0.2405	0.0253	0.1771	0.0111	0.0981	00.0001
Multi IADL (reference: two or more IADL limitations)												
Less than two	0.7846	0.6429	0.6095	0.3609	0.2737	0.0055	0.1428	<0.0001	0.1588	0.0010	0.2078	0.0012

Table A10.4 Results of the multinomial logit model with composition of the care package as dependent variable and the extended income package and the background variables as the main independent variables (weighted, 2007) (continued)

LM1B (complete)	Second-line health care		Hospital care		Informal home help		Formal home help		Informal personal care		Mixed care package	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*	OR	*P*	OR	*p*
Sex (reference: female)												
Male	0.7797	0.1469	1.5356	0.0467	0.9594	0.8451	0.6602	0.1425	1.6488	0.1568	0.8837	0.6561
Age (reference: 75+)												
60-74	1.1154	0.5592	0.9653	0.8745	0.6470	0.0404	0.1877	<0.0001	0.6274	0.1693	0.4473	0.0021
Occupational status (reference: no occupation)												
Salariat	1.7066	0.0911	1.0205	0.9585	0.9000	0.7847	1.0908	0.8502	1.1618	0.8112	1.9845	0.1262
Intermediate	1.4435	0.2240	0.9039	0.7876	1.1387	0.7164	2.1968	0.0528	1.4350	0.5362	1.1133	0.8031
Working class	0.8797	0.6686	0.9882	0.9738	1.1634	0.6601	1.1778	0.6938	0.9801	0.9713	0.9057	0.8088
Level of education (reference: low)												
High	0.9220	0.7561	1.2434	0.5055	0.7475	0.3883	1.3883	0.4469	0.8240	0.7259	0.5110	0.1083
Intermediate	0.9988	0.9879	1.3073	0.2544	1.0729	0.7536	1.8038	0.0428	0.8278	0.5973	0.8171	0.4713
Living situation (reference: single)												
Couple	0.9256	0.6867	0.7715	0.2625	0.2895	<0.0001	0.2889	<0.0001	2.8733	0.0185	0.3794	0.0005
Region (reference: Brussels)												
Flanders	0.2720	0.0046	0.4278	0.1244	0.7575	0.6407	2.4866	0.3339	48769.4807	0.9680	0.8470	0.8218
Wallonia	0.3232	0.0153	0.3144	0.0407	0.7150	0.5782	2.0546	0.4482	40636.4205	0.9685	0.8319	0.8047

Note: The reference category of the dependent variable is having a minor care package. The global effect of financial asset ownership is significant at the 0.05-level (Wald Chi^2=13.0729; p=0.0419). The global effect of the personal income package composition. home ownership. secondary residence ownership and the income level is not significant at the 0.05-level (for personal income package composition: Wald Chi^2=36.9870; p=0.4239; for home ownership: Wald Chi^2=5.8581; p=0.4393; for secondary residence: Wald Chi^2=2.3467; p=0.8850; for income level: Wald Chi^2=28.1515; p=0.2612).

Source: Author's calculations based on SHARE data wave 2

Table A10.5 Results of the binomial logit model with the use of second-line health care as dependent variable and the personal income package as the main independent variable (weighted, 2007)

LM2A	Second-line health care			
	Only income variables		Complete model	
	OR	*p*	OR	*p*
Personal income package (reference: P1)				
P2+P1	1.1193	0.5780	1.1949	0.4203
P1+P3	1.2696	0.0908	1.2880	0.1016
SS+other	1.2527	0.2986	1.2231	0.3943
Wage+other	0.7700	0.3088	0.8048	0.4309
Only P3	1.1534	0.5356	1.2722	0.3416
None	1.1486	0.4973	1.1289	0.6071
Personal income level (reference: <760)				
760-999	1.0434	0.8033	0.9213	0.6498
1000-1189	1.1557	0.4366	0.9870	0.9340
1190-1571	1.1696	0.3894	1.0489	0.8057
>1572	1.4178	0.0583	1.3423	0.1512
Subjective health (reference: poor)				
Fair to good			0.6896	0.1081
Multimorbidity (reference: two or more health related problems)				
Less than two			0.6192	0.0001
Multisymptoms (reference: two or more health related symptoms)				
Less than two			0.4394	<0.0001
Sex (reference: female)				
Male			0.9349	0.6107
Age (reference: 75+)				
60-74			1.3058	0.0456
Occupational status (reference: no occupation)				
Salariat			1.1660	0.5101
Intermediate			1.1992	0.4080
Working class			0.8486	0.4385
Level of education (reference: low)				
High			1.1451	0.4992
Intermediate			1.1105	0.4564
Living situation (reference: single)				
Couple			0.9167	0.5218
Region (reference: Brussels)				
Flanders			0.4033	0.0180
Wallonia			0.3362	0.0051

Note: The reference category of the dependent variable is having used second-line health care services during the last year. The global effect of the personal income package composition and the income level is not significant at the 0.05 level. neither before nor after the inclusion of the background variables.

Source: Author's calculations based on SHARE data wave 2

Table A10.6 Results of the binomial logit model with the use of second-line health care as dependent variable and the extended income package as the main independent variable (weighted, 2007)

LM2B	Second-line health care			
	Only income variables		Complete model	
	OR	*p*	OR	*p*
Personal income package (reference: P1)				
P2+P1	1.1154	0.5961	1.1810	0.4540
P1+P3	1.2636	0.1025	1.2796	0.1135
SS+other	1.2130	0.3771	1.1858	0.4734
Wage+other	0.7520	0.2709	0.8163	0.4614
Only P3	1.1984	0.4345	1.2940	0.3065
None	1.2063	0.3592	1.1686	0.5064
Financial asset ownership (reference: ownership)				
None	0.7396	0.3764	0.7023	0.3269
Home ownership (reference: ownership)				
None	1.3770	0.0258	1.1346	0.4114
Secondary residence ownership (reference: ownership)				
None	1.0317	0.8347	0.9761	0.8779
Total direct income level (reference: <837)				
837-1.066	1.1586	0.4109	1.0728	0.6992
1.067-1.092	1.1880	0.3335	1.0585	0.7630
1.093-1.759	1.5589	0.0141	1.4598	0.0498
>1.760	1.6597	0.0073	1.5037	0.0539
Subjective health (reference: poor)				
Fair to good			0.6708	0.0863
Multimorbidity (reference: two or more health related problems)				
Less than two			0.6242	0.0001
Multisymptoms (reference: two or more health related symptoms)				
Less than two			0.4473	<0.0001
Sex (reference: female)				
Male			0.9419	0.6508
Age (reference: 75+)				
60-74			1.2990	0.0506
Occupational status (reference: no occupation)				
Salariat			1.1435	0.5668
Intermediate			1.1955	0.4174
Working class			0.8466	0.4346
Level of education (reference: low)				
High			1.0871	0.6822
Intermediate			1.0805	0.5852
Living situation (reference: single)				
Couple			0.9192	0.5416
Region (reference: Brussels)				
Flanders			0.4061	0.0206
Wallonia			0.3447	0.0068

Note: The reference category of the dependent variable is having used second-line health care services during the last year. The global effect of the personal income package composition and the income level is not significant at the 0.05 level. neither before nor after the inclusion of the background variables.

Source: Author's calculations based on SHARE data wave 2

Table A10.7 Results of the multinomial logit model with the use of social care services as dependent variable and the personal income package as the main independent variable (weighted, 2007)

LM3A	Only income variables				Complete model			
	Only informal care		Formal and informal care		Only informal care		Formal and informal care	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Personal income package (reference: P1)								
P2+P1	1.7875	0.2541	1.1404	0.8201	2.0802	0.1810	1.7097	0.3952
P1+P3	1.0249	0.9317	0.6291	0.1555	1.1585	0.6342	0.8907	0.7492
SS+other	0.9517	0.9113	0.9084	0.8423	0.6392	0.3750	0.9397	0.9145
Wage+other	0.4810	0.2586	0.3953	0.2277	0.3591	0.1464	0.5251	0.4481
Only P3	0.5411	0.2657	0.3900	0.1171	0.4830	0.2315	0.7621	0.6913
None	0.5105	0.1644	0.5983	0.2999	0.4501	0.1362	0.8310	0.7506
Personal income level (reference: <760)								
760-999	1.1163	0.7810	1.2224	0.6214	0.8783	0.7549	1.2007	0.6825
1000-1189	0.5411	0.1450	0.4438	0.0702	0.5240	0.1478	0.4469	0.1050
1190-1571	0.6995	0.3819	0.3236	0.0174	0.7788	0.5676	0.4472	0.1216
>1572	0.7138	0.4459	0.4655	0.1184	0.9686	0.8451	0.8067	0.6993
Subjective health (reference: poor)								
Fair to good					0.5661	0.2195	0.4695	0.1162
Multimorbidity (reference: two or more health related problems)								
Less than two					1.4856	0.1570	1.1640	0.6448
Multisymptoms (reference: two or more health related symptoms)								
Less than two					0.9619	0.8924	0.9233	0.8166
Multi ADL limitations (reference: two or more ADL limitations)								
Less than two					1.2250	0.3840	0.6223	0.0375
Multi IADL limitations (reference: two or more IADL limitations)								
Less than two					0.8602	0.4359	0.6016	0.0113
Sex (reference: female)								
Male					1.1335	0.6607	0.6858	0.2703
Age (reference: 75+)								
60-74					2.0514	0.0076	1.1584	0.6362

Table A10.7 Results of the multinomial logit model with the use of social care services as dependent variable and the personal income package as the main independent variable (weighted, 2007) (continued)

LM3A	Only income variables				Complete model			
	Only informal care		Formal and informal care		Only informal care		Formal and informal care	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Occupational status (reference: no occupation)								
Salariat					0.4232	0.0697	0.9104	0.8581
Intermediate					0.5282	0.1474	0.7708	0.5914
Working class					1.1408	0.7698	1.0111	0.9782
Level of education (reference: low)								
High					0.6523	0.3264	0.6087	0.3143
Intermediate					0.6096	0.1091	0.5763	0.1137
Living situation (reference: single)								
Couple					0.7657	0.3343	0.5630	0.0768
Region (reference: Brussels)								
Flanders					1.0905	0.9087	5.5338	0.0962
Wallonia					0.7284	0.6796	3.0720	0.2796

Note: The reference category of the dependent variable is having received only formal care during the last year. In the model that includes only income variables. the global effect of the income level is significant at the 0.05 level (Wald Chi^2=17.1516; *p*= 0.0309). but the global effect of the personal income package composition is not significant at this alpha-level (Wald Chi^2=10.9091; *p*=0.5372). In the complete model. neither the global effect of the personal income package composition. nor the global effect of the generosity of the income package is significant at the 0.05-level (for the income package composition: Wald Chi^2=11.4419; *p*=0.1905 / for the income level: Wald Chi^2=11.4108; *p*=0.1905).

Source: Author's calculations based on SHARE data wave 2

Table A10.8 Results of the multinomial logit model with the use of social care services as dependent variable and the extended income as the main independent variable (weighted, 2007)

LM3B	Only income variables				Complete model			
	Only informal care		Formal and informal care		Only informal care		Formal and informal care	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Personal income package (reference: P1)								
P2+P1	1.8390	0.2343	1.1572	0.8011	2.0854	0.1809	1.5536	0.4896
P1+P3	1.0527	0.8574	0.6127	0.1314	1.1907	0.5733	0.8555	0.6679
SS+other	0.9409	0.8918	0.8551	0.7469	0.5841	0.2890	0.8070	0.7085
Wage+other	0.4853	0.2696	0.4040	0.2425	0.3428	0.1304	0.4288	0.3207
Only P3	0.5238	0.2361	0.4087	0.1357	0.4301	0.1551	0.6822	0.5720
None	0.4750	0.1259	0.5634	0.2492	0.4272	0.1149	0.8419	0.7689
Financial asset ownership (reference: ownership)								
None	1.7740	0.4667	1.5221	0.6139	1.2221	0.8090	0.7307	0.7319
Home ownership (reference: ownership)								
None	0.8321	0.4929	0.8315	0.5330	0.9333	0.8101	0.6757	0.2360
Secondary residence ownership (reference: ownership)								
None	0.7723	0.4741	0.7873	0.5586	0.6257	0.2155	0.4479	0.0666
Total direct income level (reference: <837)								
837-1066	0.7328	0.4665	0.8615	0.7310	0.6220	0.2898	0.8236	0.6809
1067-1092	0.5344	0.1517	0.3264	0.0154	0.6038	0.2905	0.4135	0.0863
1093-1759	0.4120	0.0432	0.2986	0.0102	0.4624	0.0975	0.3998	0.0741
>1760	0.4993	0.1345	0.3221	0.0228	0.6674	0.4146	0.5255	0.2521
Subjective health (reference: poor)								
Fair to good					0.5679	0.2268	0.4126	0.0666
Multimorbidity (reference: two or more health related problems)								
Less than two					1.4542	0.1817	1.1268	0.7179
Multisymptoms (reference: two or more health related symptoms)								
Less than two					0.9586	0.8836	0.8730	0.6948
Multi ADL limitations (reference: two or more ADL limitations)								
Less than two					1.5381	0.3576	0.4036	0.0479
Multi IADL limitations (reference: two or more IADL limitations)								
Less than two					0.7648	0.4942	0.3606	0.0117

Table A10.8 Results of the multinomial logit model with the use of social care services as dependent variable and the extended income as the main independent variable (weighted, 2007) (continued)

LM3B	Only income variables				Complete model			
	Only informal care		Formal and informal care		Only informal care		Formal and informal care	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Sex (reference: female)								
Male					1.1316	0.6647	0.7157	0.3252
Age (reference: 75+)								
60-74					2.0645	0.0071	1.1767	0.6000
Occupational status (reference: no occupation)								
Salariat					0.4568	0.1014	1.0028	0.9563
Intermediate					0.5354	0.1608	0.7742	0.6014
Working class					1.1943	0.6946	1.1324	0.8027
Level of education (reference: low)								
High					0.6330	0.3030	0.5485	0.2367
Intermediate					0.6184	0.1230	0.5790	0.1199
Living situation (reference: single)								
Couple					0.7369	0.2770	0.4830	0.0266
Region (reference: Brussels)								
Flanders					1.1950	0.8129	4.9145	0.1200
Wallonia					0.7874	0.7542	2.5957	0.3551

Note: The reference category of the dependent variable is having received only formal care during the last year. The model that includes only income variables is not significant at the 0.05 level. In the complete model. none of the income variables is significant at the alpha-level of 0.05.

Source: Author's calculations based on SHARE data wave 2

Table A10.9 Results of the multinomial logit model with the intensity of health care services use as dependent variable and the personal income package as the main independent variable (weighted, 2007)

LM4A	Only income variables				Complete model			
	Moderate		High		Moderate		High	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Personal income package (reference: P1)								
P2+P1	0.6717	0.1025	0.3989	0.0008	0.9980	0.9885	0.7307	0.3189
P1+P3	0.7164	0.0487	0.4634	<0.0001	0.8729	0.4694	0.6532	0.0437
SS+other	0.7738	0.3220	0.5868	0.0468	0.9875	0.9653	0.6493	0.1923
Wage+other	0.5641	0.0740	0.1506	0.0002	0.8394	0.6117	0.2429	0.0095
Only P3	0.5722	0.0590	0.4175	0.0034	0.8167	0.5351	0.7830	0.4938
None	0.9963	0.9818	0.4720	0.0051	1.4608	0.1791	0.6627	0.2195
Personal income level (reference: <760)								
760-999	1.8524	0.0039	1.3813	0.1382	1.5602	0.0530	0.9978	0.8513
1000-1189	1.6879	0.0267	1.3941	0.1554	1.5269	0.0929	1.2523	0.3988
1190-1571	1.8683	0.0048	0.9035	0.6769	1.8736	0.0088	0.9804	0.8662
>1572	1.1496	0.5528	0.7094	0.1778	1.4307	0.1686	1.0525	0.7418
Subjective health (reference: poor)								
Fair to good					0.2114	<0.0001	0.0825	<0.0001
Multimorbidity (reference: two or more health related problems)								
Less than two					0.4364	<0.0001	0.3414	<0.0001
Multisymptoms (reference: two or more health related symptoms)								
Less than two					0.5701	0.0002	0.2960	<0.0001
Sex (reference: female)								
Male					0.8702	0.3884	1.3885	0.0831
Age (reference: 75+)								
60-74					0.5745	0.0005	0.5299	0.0003
Occupational status (reference: no occupation)								
Salariat					1.6094	0.1027	0.6281	0.1386
Intermediate					1.4747	0.1595	0.7691	0.3634
Working class					1.4627	0.1562	0.7225	0.2452

Table A10.9 Results of the multinomial logit model with the intensity of health care services use as dependent variable and the personal income package as the main independent variable (weighted, 2007) (continued)

LM4A	Only income variables				Complete model			
	Moderate		High		Moderate		High	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Level of education (reference: low)								
High					0.5073	0.0072	0.5727	0.0541
Intermediate					1.0393	0.8232	0.8726	0.4776
Living situation (reference: single)								
Couple					0.8117	0.2036	0.7095	0.0679
Region (reference: Brussels)								
Flanders					1.5382	0.3096	4.3900	0.0289
Wallonia					2.1303	0.0770	4.7165	0.0227

Note: The reference category of the dependent variable is having a low intensity of health care services use during the last year. In the model that includes only income variables. the income level and the income package composition are statistically significant at the 0.05 level (for the income package composition: Wald Chi^2=40.7695; p<0.0001 / for the income level: Wald Chi^2=25.4888; p=0.0015). In the complete model. neither the global effect of the personal income package composition. nor the global effect of the generosity of the income package is significant at the 0.05-level.

Source: Author's calculations based on SHARE data wave 2

Table A10.10 Results of the multinomial logit model with the intensity of health care services use as dependent variable and the extended income package as the main independent variable (weighted, 2007)

LM4B	Only income variables				Complete model			
	Moderate		High		Moderate		High	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Personal income package (reference: P1)								
P2+P1	0.7223	0.1868	0.4691	0.0064	0.9957	0.9841	0.7578	0.3812
P1+P3	0.7514	0.0942	0.5033	0.0001	0.8793	0.4953	0.6739	0.0625
SS+other	0.8358	0.4907	0.6407	0.1001	1.0301	0.9188	0.6980	0.2794
Wage+other	0.5365	0.0531	0.1534	0.0003	0.7958	0.5101	0.2520	0.0118
Only P3	0.5913	0.0754	0.4952	0.0190	0.7834	0.4506	0.8257	0.5909
None	0.9888	0.9626	0.5203	0.0152	1.3885	0.2397	0.6775	0.2427
Financial asset ownership (reference: ownership)								
None	2.4039	0.0377	2.2089	0.0651	1.8131	0.1812	1.5650	0.3568
Home ownership (reference: ownership)								
None	1.0559	0.7488	1.2258	0.2412	0.8107	0.2642	0.9028	0.6200
Secondary residence ownership (reference: ownership)								
None	1.4455	0.0437	1.8659	0.0050	1.1820	0.3916	1.2351	0.3906
Total direct income level (reference: <837)								
837-1066	1.3951	0.1302	1.1617	0.5036	1.1983	0.4472	0.9392	0.7355
1067-1092	1.5896	0.0341	1.1750	0.4882	1.5010	0.0848	1.2205	0.4598
1093-1759	1.2765	0.2763	0.9341	0.7712	1.3817	0.1858	1.1724	0.5561
>1760	1.1413	0.5673	0.7453	0.2702	1.3250	0.2793	0.9791	0.6714
Subjective health (reference: poor)								
Fair to good					0.2116	<0.0001	0.0837	<0.0001
Multimorbidity (reference: two or more health related problems)								
Less than two					0.4346	<0.0001	0.3381	<0.0001
Multisymptoms (reference: two or more health related symptoms)								
Less than two					0.5560	0.0001	0.3002	<0.0001
Sex (reference: female)								
Male					0.8631	0.3610	1.3766	0.0909
Age (reference: 75+)								
60-74					0.5793	0.0006	0.5296	0.0004

Table A10.10 Results of the multinomial logit model with the intensity of health care services use as dependent variable and the extended income package as the main independent variable (weighted, 2007) (continued)

LM4B	Only income variables				Complete model			
	Moderate		High		Moderate		High	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Occupational status (reference: no occupation)								
Salariat					1.6581	0.0835	0.6292	0.1405
Intermediate					1.4844	0.1534	0.7683	0.3624
Working class					1.5233	0.1189	0.6984	0.2019
Level of education (reference: low)								
High					0.5106	0.0087	0.5809	0.0636
Intermediate					1.0408	0.8177	0.8592	0.4320
Living situation (reference: single)								
Couple					0.8056	0.1946	0.6973	0.0567
Region (reference: Brussels)								
Flanders					1.4230	0.4103	4.1426	0.0384
Wallonia					1.9761	0.1145	4.3699	0.0323

Note: The reference category of the dependent variable is having a low intensity of health care services use during the last year. In the model that is limited to the income variables. only the composition of the personal income package and secondary residence ownership are statistically significant at the 0.05 level. In the complete model. no income variables are statistically significant at the 0.05 level.

Source: Author's calculations based on SHARE data wave 2

Table A10.11 Results of the multinomial logit model with the intensity of formal care services use as dependent variable and the personal income package as the main independent variable (weighted, 2007)

LM5A	Only income variables				Complete model			
	Moderate		High		Moderate		High	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Personal income package (reference: P1)								
P2+P1	0.8572	0.7820	0.0000	0.9905	1.6757	0.2426	4.3359	0.0370
P1+P3	0.7867	0.4965	0.8755	0.7874	1.1669	0.8165	0.6942	0.7328
SS+other	0.6300	0.3575	0.6172	0.5250	1.4470	0.7264	1.5054	0.8051
Wage+other	0.5850	0.5271	0.6577	0.7252	3.5722	0.0925	0.0000	0.9940
Only P3	1.0747	0.9067	0.0000	0.9911	5.8133	0.0109	5.0815	0.1502
None	1.2263	0.6990	0.7649	0.7321	0.4090	0.0815	0.8332	0.8086
Personal income level (reference: <760)								
760-999	0.9313	0.8658	1.1525	0.6674	1.3542	0.5930	1.5374	0.6539
1000-1189	0.9852	0.8440	0.6391	0.5598	1.4691	0.5161	1.2375	0.7364
1190-1571	0.6605	0.3997	0.3101	0.1515	2.9701	0.0937	8.2339	0.0742
>1572	0.9110	0.8447	0.9037	0.6899	0.5554	0.3995	0.0000	0.9923
Subjective health (reference: poor)								
Fair to good					0.7327	0.4130	0.5365	0.3492
Multimorbidity (reference: two or more health related problems)								
Less than two					1.1621	0.7066	0.6922	0.6609
Multisymptoms (reference: two or more health related symptoms)								
Less than two					1.2098	0.7106	0.2555	0.0443
Multi ADL limitations (reference: two or more ADL limitations)								
Less than two					0.2341	0.0014	0.0805	0.0004
Multi IADL limitations (reference: two or more IADL limitations)								
Less than two					0.7593	0.4875	1.1280	0.8533
Sex (reference: female)								
Male					0.2968	0.0008	0.2100	0.0154
Age (reference: 75+)								
60-74					0.2968	0.0008	0.2100	0.0154

Table A10.11 Results of the multinomial logit model with the intensity of formal care services use as dependent variable and the personal income package as the main independent variable (weighted, 2007) (continued)

LM5A	Only income variables				Complete model			
	Moderate		High		Moderate		High	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Occupational status (reference: no occupation)								
Salariat					1.5853	0.4589	0.2370	0.2097
Intermediate					3.2937	0.0396	2.9163	0.2071
Working class					1.6035	0.3995	1.0330	0.9669
Level of education (reference: low)								
High					0.5108	0.2481	1.8034	0.5222
Intermediate					1.0606	0.8803	0.5265	0.3270
Living situation (reference: single)								
Couple					0.3399	0.0050	0.2339	0.0260
Region (reference: Brussels)								
Flanders					1.1596	0.8936	11840779	0.9949
Wallonia					0.2975	0.2820	3628464	0.9952

Note: The reference category of the dependent variable is having a low intensity of social care services use during the last year. None of the income variables are statistically significant at the 0.05 level.

Source: Author's calculations based on SHARE data wave 2

Table A10.12 Results of the multinomial logit model with the intensity of social care services use as dependent variable and the extended income package as the main independent variable (weighted, 2007)

LM5B	Only income variables				Complete model			
	Moderate		High		Moderate		High	
	OR	*p*	OR	*p*	OR	*p*	OR	*p*
Personal income package (reference: P1)								
P2+P1	0.8791	0.8189	0.0000	0.9902	0.5016	0.3368	0.0000	0.9921
P1+P3	0.7647	0.4416	0.8781	0.7939	1.6811	0.2419	5.8656	0.0168
SS+other	0.6678	0.4254	0.7011	0.6484	1.1809	0.8044	0.6263	0.6753
Wage+other	0.6531	0.6176	0.9254	0.8863	1.5367	0.6830	1.3467	0.8661
Only P3	1.1266	0.8463	0.0000	0.9907	2.3575	0.2462	0.0000	0.9936
None	1.1455	0.7984	0.6905	0.6478	4.8995	0.0225	4.6916	0.1972
Financial asset ownership (reference: ownership)								
None	0.5491	0.4472	0.8734	0.8919	0.3337	0.2545	0.2750	0.3434
Home ownership (reference: ownership)								
None	1.0503	0.8768	1.0273	0.9377	0.8064	0.5882	0.5485	0.3458
Secondary residence ownership (reference: ownership)								
None	1.4212	0.4024	5.6724	0.1063	1.2444	0.6616	4.5985	0.2860
Total direct income level (reference: <837)								
837-1066	0.9086	0.7525	0.8382	0.6525	1.0624	0.7477	1.3266	0.5569
1067-1092	0.6696	0.4087	0.3322	0.2172	0.9304	0.7993	1.1666	0.5296
1093-1759	0.6884	0.4554	0.2178	0.0807	1.3069	0.6313	0.6560	0.7063
>1760	0.8968	0.8032	1.0574	0.7074	2.3881	0.1855	10.7999	0.0848
Subjective health (reference: poor)								
Fair to good					0.4306	0.1020	0.7498	0.7021
Multimorbidity (reference: two or more health related problems)								
Less than two					0.7176	0.3885	0.5283	0.3509
Multisymptoms (reference: two or more health related symptoms)								
Less than two					1.0665	0.8728	0.6333	0.5958
Multi ADL limitations (reference: two or more ADL limitations)								
Less than two					1.1920	0.7364	0.2631	0.0549
Multi IADL limitations (reference: two or more IADL limitations)								
Less than two					0.2164	0.0012	0.0656	0.0005

Table A10.12 Results of the multinomial logit model with the intensity of social care services use as dependent variable and the extended income package as the main independent variable (weighted, 2007) (continued)

LM5B	Only income variables				Complete model			
	Moderate		High		Moderate		High	
	OR	*p*	OR	*p*	OR	*P*	OR	*p*
Sex (reference: female)								
Male					0.7345	0.4403	1.1336	0.8524
Age (reference: 75+)								
60-74					0.2845	0.0006	0.1971	0.0170
Occupational status (reference: no occupation)								
Salariat					1.7572	0.3752	0.2132	0.2024
Intermediate					3.2598	0.0469	2.7121	0.2595
Working class					1.6055	0.3996	1.0580	0.8984
Level of education (reference: low)								
High					0.4750	0.2279	1.8974	0.5413
Intermediate					1.0818	0.8446	0.4950	0.3142
Living situation (reference: single)								
Couple					0.3732	0.0102	0.1947	0.0250
Region (reference: Brussels)								
Flanders					0.9975	0.9620	8885044	0.9947
Wallonia					0.2521	0.2327	2703614	0.9951

Note: The reference category of the dependent variable is having a low intensity of social care services use during the last year. None of the income variables is significant at the 0.05 level.

Source: Author's calculations based on SHARE data wave 2

SUMMARY

From the observation that population ageing goes together with an increasing importance of age specific social risks, like financial and (long-term) care dependency, this dissertation investigates how elderly protection themselves against the financial and physical dimensions of old age dependency. This PhD investigates the sources used by the Belgian elderly population to protect themselves against the financial and physical dimensions of old age dependency. Based on the packaging perspective, developed by Rainwater et al. (1986), the clustering of income and care sources into resp. income and care packages is investigated. Particular attention is paid to differences (inequalities) among the elderly population, and to the reproduction of inequalities from one package to another. To put it differently, we investigate whether inequalities in the old age income package are reflected in inequalities in the old age care package.

To do so, data from the second wave of the Survey on Health, Ageing and Retirement in Europe (SHARE) are used. The research population is limited to individuals aged 60 and over living in private households in Belgium. A quantitative research design is set up to investigate the research questions that arose from the literature review including among other the main results from earlier research on the social protection of the elderly population.

The research shows that there is a certain degree of commodification in the protection against the financial dimension of old age dependency. Elderly that combine different personal income sources more often have a more generous old age income package, and, in addition, elderly with a more generous personal income package overall also have a more generous asset package. Similar results were found for the direct contribution of the asset package, including the direct revenues from financial assets and secondary residence, and for the simulated contribution of the asset package, that includes simulated annuities based on the wealth accumulated in financial assets and secondary residence as well as a reverse mortgage on home ownership.

However, when we consider the protection against the functional dimension of old age dependency (i.e. the health and social care package), we do not find evidence of such a commodification. On the contrary, the inequalities in the old age income package are not transposed to the old age care package. This decommodification of the old age care package is expected to stem from the broad and quite generous national health insurance scheme that has been installed in Belgium and that covers a wide range of health and social care services protecting the older population against the negative consequences of functional dependency in old age.

NEDERLANDSTALIGE SAMENVATTING

Vertrekkende van de vaststelling dat de vergrijzing van de bevolking gepaard gaat met een toenemend belang van leeftijdsspecifieke sociale risico's, zoals financiële en langdurige zorgafhankelijkheid, onderzoekt deze doctoraatsthesis hoe de oudere bevolking zichzelf beschermd tegen de gevolgen van deze leeftijdsafhankelijkheid. De verschillende bronnen die hiervoor gebruikt worden door de Belgische oudere bevolking, alsook de samenhang tussen deze bronnen, worden grondig onderzocht. De theoretische basis hiervoor ligt in de *packaging* benadering, die in de jaren 1980 ontwikkeld werd door Rainwater en zijn collega's (1986). Bijzondere aandacht gaat uit naar de verschillen die bestaan tussen ouderen onderling, en hoe deze verschillen uitmonden in structurele ongelijkheden wat betreft de bescherming die men geniet tegen de financiële en fysieke dimensies van leeftijdsafhankelijkheid. De nadruk wordt hier gelegd op de accumulatie van ongelijkheden over de verschillende pakketten heen, of, met andere woorden, hoe ongelijkheden in het inkomenspakket worden gereflecteerd in ongelijkheden in het zorgpakket van de oudere in kwestie.

Om de verschillende onderzoeksvragen te beantwoorden kozen we voor een kwantitatieve analyse van secundaire data. Gegevens van de tweede onderzoeksgolf van de Survey of Health, Ageing and Retirement in Europe (SHARE) worden gebruikt. De onderzoekspopulatie heeft betrekking of personen van 60 jaar of ouder die deel uitmaken van private huishoudens in België.

Uit het onderzoek blijkt dat er een zekere vorm van *commodificatie* van de bescherming die de oudere bevolking geniet tegen de financiële dimensie van leeftijdsgerelateerde afhankelijkheid optreedt. Ouderen die verschillende inkomensbronnen combineren hebben doorgaans een meer genereus inkomenspakket, en bovendien hebben deze ouderen doorgaans ook een betere toegang tot vermogens (nl. financiële vermogen, huiseigenaarschap en eigenaarschap van huureigendommen). Dit geldt zowel voor de resultaten op basis van de directe opbrengst van vermogens (nl. interesten van financiële vermogens en huuropbrengsten van huureigendommen) als voor de resultaten op basis van de gesimuleerde opbrengst van vermogens (nl. gesimuleerde rente op basis van het financiële vermogen en de waarde van de huureigendommen, alsook een omgekeerde hypotheek op basis van de eigen woning). Echter, wanneer we de bescherming tegen de fysieke dimensie van leeftijdsgerelateerde afhankelijkheid onderzoeken, vinden we geen direct bewijs van een soortgelijke *commodificatie*. Integendeel, ongelijkheden in het inkomenspakket worden niet perse vertaald in ongelijkheden in het zorgpakket. Deze *decommodificatie* van het zorgpakket is waarschijnlijk het gevolg van de omvattende en genereuze gezondheidszorgverzekering die ontwikkeld is in België. Dit quasi-universeel systeem compenseert het gebruik van de meerderheid van de gezondheidszorg en de langdurige zorgvoorzieningen, en beschermt de oudere bevolking tegen de negatieve gevolgen van leeftijdsgerelateerde fysieke afhankelijkheid.

RESUMÉ EN FRANÇAIS

La vieillissement du population augmente l'importance des risques relate au grand âge, comme la dépendance financier et physique. Le doctorat examine la protection de la population âgées contre les conséquences relate aux cette dépendance financier et physique. Fondé théorétique à l'approche packaging, formulé par Rainwater, Rein et Schwartz en 1986, la combinaison de sources différentes est considérée comme la solution pour combattre les conséquences négatives relatées au grand âge. Nous recherchons la combinaison des sources en "paquets" de revenues et de soins (income and care packages). L'objectif de notre étude consiste à analyser les différences entre les personnes âgées concernant les paquets de revenues et de soins. Aussi, nous souhaitons démontrer comment les différences dans les paquets de revenues et de soins influencent la protection contre la dépendance financier et physique de la population âgée. Nous recherchons si les inégalités dans les paquets de revenus sont transférées dans les paquets de soins.

Les analyses quantitative sont basées sur les données de la Survey of Health, Ageing and Retirement in Europe (SHARE), menée en 2006-2007. Les données concernent les revenues financières (par exemple les pensions de retraite et les pensions complémentaires), les économies, le logement, les soins de santé, et les soins de santé social. La population de recherché est limité aux personnes Belges de 60 ans et plus, qui habitent chez-soi.

Notre étude révèle une *commodification* de la protection contre la dépendance financier de la population âgée. Les personnes âgées, qui combinent différentes revenues, ont un paquet des revenues plus généreuse, et, en plus, ce groupe a plus accès à des sources fortunes (comme la logement et les économies). Notre étude des paquets de soins, par contre, ne démontre pas une transmission des inégalités des paquets de revenues aux paquets de soins. Les différences entre les personnes âgées par rapport à leur protection par la dépendance physique ne sont pas relatées aux différences des paquets de revenus. Cette *decommodification* est le success de l'assurance maladie qui a été développé en Belgique pendant les derniers décennies.

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